RELATIONSHIPS AMONG PATIENTS' EXPECTATIONS, NURSES' PERFORMANCE OF FAMILY NURSING INTERVENTIONS, AND ADHERENCE/COMPLIANCE: A GAP ANALYSIS

By

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Abstract of Dissertation Presented to the Graduate School
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This study used a gap analysis to examine the differences between patients' and nurses' perceptions of importance and nurses' performance of family interventions and the relationship among patients' and nurses' importance and performance gaps and indirect and pseudo-direct measures of compliance.

In a cohort design, personal surveys were conducted with a convenience sample of 10 nurse practitioners and 169 patients between June 1999 and October 1999. The nurse sample was restricted to nurse practitioners with at least 2 years of experience treating adult patients with cardiovascular disease or diabetes. The patient sample was restricted to patients under treatment for cardiovascular disease (CVD) or diabetes who had completed at least three prescheduled clinic appointments with the nurse practitioner at the clinics used in this study. Both CVD and diabetes require multiple interventions and are common causes of morbidity and mortality.

The results provided evidence of two major dimensions and gaps in nursing family interventions: Teaching and Strategizing. The Teaching gap factor was composed of items related to teaching the family about the patient's condition. The Strategizing gap factor was composed of items related to helping the family develop strategies for coping with the situation and supporting the patient. The results also suggested nurses' perception of their patients' compliance with nonmedication regimens was related to how well the nurse helped the patient's family develop strategies for dealing with the patient's condition. The nurses' Teaching gap factor was related to nurses' pseudo-direct measures of patients' compliance with medication regimens.

The results of this study provided positive, yet limited, support for the use of family interventions to enhance patients' compliance. The results also suggested that nursing theory and research may need to treat the concept of family interventions as a more simple concept than is currently conceived and may need to treat compliance as a more complex concept than is currently conceived. Lastly, the results suggested the need for reciprocal information transfer among family intervention theorists and researchers and nurse practitioners and their patients. Directions for future research are discussed.

CHAPTER 1
STATEMENT OF THE PROBLEM

Compliance

Patient compliance, conceptually defined as " . . . the extent to which a person's behavior (in terms of taking medications, following diets, or executing lifestyle changes) coincides with medical or health advice" (Haynes 1979, pp. 1-2), has long been a significant concern in healthcare. Hippocrates is reportedly to have remarked, "(The physician) should keep aware of the fact that patients often lie when they state that they have taken certain medicines" (Gordis, 1979, p.35).

Although Haynes' (1979) definition has been criticized because of the paternalistic role given to healthcare provider, reviewers often overlooked that Haynes added *adherence* to the definition, "The term *adherence* may be used interchangeably with compliance" (p. 2). Madden (1990) argued that *compliance* and *adherence* referred to the outcomes of the patient-provider interaction, while *therapeutic alliance* referred to the process of the interaction itself. Some authors prefer to use the term *adherence* because it is less judgmental (Moore, 1995; Ward-Collins, 1998). Interestingly, Kyngas, Duffy and Kroll (2000), in an article published after this study's data collection ended and analysis began in October 1999, noted that there was no generally accepted definition of compliance. The authors (Kyngas, Duffy & Kroll, 2000) noted the use of alternative terms including adherence, cooperation, mutuality and therapeutic alliance. Kyngas et al. (2000) concluded that the concept of *compliance* related to patients' self-care

responsibilities, their role in the treatment process, and their collaboration with health care providers. This is the perspective that was used for this study. Likewise, the term *compliance* was used with respect to patients' right to choose.

Regardless of the specific term used, compliance is critical to the success of therapeutic health regimens and treatment plans (Clark & Becker, 1998). When compliance is absent or low (noncompliance), therapeutic goals go unmet or, at best, are only partially achieved (Becker & Maiman, 1980; Dracup & Meleis, 1982).

Compliance can be viewed as an attitude or as a behavior. As an attitude, compliance is a willingness or intention to follow health prescriptions. As a behavior, compliance is the actual carrying out of prescriptions (Davis, 1968). Whether conceived of as an attitude or a behavior, the effects of even the most well designed health care regimens are mediated by the patients' attitudes and behaviors toward compliance.

Incidence of Compliance and Noncompliance

Haynes (Sackett & Haynes, 1976) review of compliance studies found that 50% of patients do not take prescribed medications. Silverman (1982) reported that patient's compliance at mental health centers showed a 20 to 50% dropout rate for psychotherapy session attendance. Sachs (1982) reported a 30 to 70% dropout rate for exercise type health related programs. Dunbar (1990) estimated that nonadherence rates ranged from 20% to 80%. Simons (1992) reported that patient compliance ranged from 10 to 94%. More recently, Fishman, Finney, Rapoff & Christophersen (1995) found that at least one-third of patients fail to comply with their specific healthcare regimens. Clark and Becker (1998) estimated that only one-third of patients correctly follow physicians' directives. More recent research, meaning studies published after this study's data collection had

ended and analysis began in October 1999, reinforced the challenge of compliance. For example, Evangelista & Dracup (2000) estimated that one-third to one-half of all patients are noncompliant.

Effects of Noncompliance

In addition to the obvious risks of noncompliance for the patient and the patient's social support, noncompliance affects the U.S. economy. Baer (1986) pointed out that when approximately 39.7% of health care costs are paid for by federal and state governments, society pays for the largest portion of hospital-incurred health care costs. To the degree that compliant behavior leads to healthy citizens who do not return to the hospital, these governmental expenditures contribute to society and its economy, and to the degree that noncompliant behavior leads to returns to the hospital, these governmental expenditures lead to economic waste. Baer (1986) also suggested that noncompliance could lead to increased medical costs and loss of productivity of the individual due to exacerbation of preventable diseases. Currently, in areas of health care where cost-containment is at the core of delivery, the main approach is to insure quality when defining basic health care services. This is accomplished by incorporating interventions that are effective, efficient, appropriate and desired by the patients (Walters & Morgan, 1995).

Today's rapidly changing health care environment in the United States is an important reason to define aspects of care needed to provide comprehensive quality care. Nurses, the largest segment of health care providers, have an opportunity to enhance patient care and affect the economics of the health care delivery system by increasing compliance among patients (Simons, 1992).

Nonjudgmental/Ethical Perspective of Compliance

It is important for the reader to understand that *compliance* is generally used as a nonjudgmental concept. It is not used to connote fault or to be interpreted as judgmental. The reader should not perceive that a compliant patient is "good" or that a noncompliant patient is "bad." In any one situation, a number of environmental factors and individuals, including the patient and the health care worker, influence compliance. Likewise, the reader should not perceive *compliance* as something a patient must be. An individual in our society has the right to refuse to follow health advice in all but a few legally defined situations. *Compliance* is a choice an individual has the freedom to make.

The term *compliance* is used in this study from a nonjudgmental perspective to keep important ethical and social issues in the forefront of compliance research and management (Haynes, Taylor & Sackett, 1979). The focus of this study is on *ethical compliance*. Specifically, this study was built on the following assumptions about the patients' conditions (Sackett & Haynes, 1976):

1. The diagnosis was correct;
2. The prescribed therapy would do more good than harm; and
3. The patient was an informed willing partner in the execution of all efforts designed to alter compliance behavior.

Operationalizations of the Concept: Compliance

Generally, compliance is measured by one of two approaches: Direct or Indirect. Direct measures, including results of lab tests (e.g., blood and urine, weight, etc.) are essential but not without difficulties. From the positive perspective, direct measures tend to be more objective and offer methods of assessing compliance without the patient being

aware that compliance is being assessed. For example, a patient may not be aware that the presence of a medication would appear in a urinalysis. Gordis (1979) cautioned researchers to be aware of the two major limitations of direct measures of compliance: sensitivity of tests and specificity of detection and subjective judgments must be used to determine how to define or classify a patient as compliant or noncomplaint on the basis of test results.

Indirect methods include therapeutic or preventive outcome, such as keeping appointments, opinion of the health care provider, opinion of the patient, filling a prescription and pill count. While the use of the therapeutic or preventive outcome may seem obvious, Gordis (1979) suggested that outcomes are best considered indirect because outcomes may be affected by factors other than the prescribed regimen. For example, a person with multiple medications may achieve a positive outcome because of a medication other than the one prescribed. Similarly, other external factors, such as socioeconomic and cultural variables may affect the outcome.

One of the more widely used methods of measuring compliance is interviewing the patient and/or health care provider. Since there is little or no evidence that complying patients misrepresent themselves as noncompliers or that noncompliers misrepresent themselves as compliers, Gordis (1979) concluded that while there are serious questions of the validity of patients' opinions as measures of compliance, patients' opinions are useful indicators of compliance, especially when the objective is to identify noncompliers. Rand and Weeks (1998) reported that patient self-reports were highly accurate and probably a necessity in most studies.

Physician (health care provider) interviews have also been used to assess compliance. Generally, findings on physician interviews suggest that the physician's estimate of patient compliance is of very limited value in research (Gordis, 1979). Rand and Weeks (1998) concluded that even nurse practitioners were not good judges of patient adherence.

Managing Compliance

Most authors agree that managing compliance requires a multi-faceted approach. Becker & Maiman's (1980) review of existing theory and research led them to recommend the following ten interventions for health care workers:

1. Improving patients' level of information concerning the specifics of their regimens, reinforcing essential points with review, discussion and written instructions, and emphasizing the importance of the therapeutic plan.

2. Taking clinically appropriate steps to reduce the cost, complexity, duration, and amount of behavioral change required by the regimen and increasing the regimen's convenience through "tailoring" and other approaches.

3. Obtaining a compliance-oriented history of the patient's prior experiences and present health beliefs and, when necessary, employing strategies to modify those perceptions likely to inhibit compliance.

4. Improving levels of patient satisfaction, particularly with the provider-patient relationship.

5. Arranging for the continued monitoring of the patient's subsequent compliance with treatment.

6. Increasing staff awareness of the magnitude and determinants of the noncompliance phenomenon and attempting to develop an "active influence orientation" in each member of the health care team.

7. Using such techniques as patient-provider contracts to involve therapeutic decisions in the setting of treatment objectives and creating incentives (through rewards and reinforcements) for achieving these objectives.

8. Arranging for as much continuity of provider (and other staff) as possible.

9. Establishing methods of supervising the patient, including involvement of the patient's social support network.

10. Involving fully the assistance of all health care providers, assigning specific roles and responsibilities for activities directed at improving adherence to treatment.

Research on Variables Related to Compliance

Although few studies have reported significant correlation between compliance and demographics, disease features, and side effects (Fishman, Finney, Rapoff & Christophersen, 1995), social and psychological factors have produced more significant results. Cameron (1996) suggested five major areas of focus for research on the social and psychological aspects of compliance. While these categories are not mutually exclusive, they provide a useful framework for organizing previous research and developing focus for future research:

1. Knowledge and understanding refers to patients' knowledge and understanding of their health and/or disease;

2. Quality of interaction is the quality of the interaction between the patient and provider;

3. Social isolation and social support refers to the family environment and the patient-provider partnership;

4. Health beliefs and attitudes are the beliefs and attitudes, or existing patient predispositions, affecting health behavior and compliance; and

5. Illness and treatment is the severity, complexity, and duration of the medical and health regimens.

Knowledge and Understanding

Although the results of research on knowledge and understanding are contradictory, there is evidence that nurses and patients value knowledge and understanding; nurses and patients benefit from training of nurses; and knowledge and

understanding are related to readmission rates and taking medications. Grant, Ferrell, Rivera and Lee (1995) tested the effect of an educational program for nurses, not patients, on readmissions for uncontrolled pain. The Pain Resource Training Program reduced the number of patients readmitted for uncontrolled pain. Interestingly, while patients were not the direct focus of the training, patients seemed to benefit from the nurses' training.

Vivian (1996) found that both nurses and patients had a strong belief in patient education, supporting a pro-social, collaborative model of compliance. In addition, Vivian's (1996) results revealed that most of the nurses' time was spent educating patients. In a survey of nurses in Scotland, Thomson and Kohli (1997) found that most (67%) agreed that health promotion (education) was an important function of the nurse and that 60% were interested in developing their health promotion role in clinical care.

Donlevy and Peitruch (1996) reported efforts of a nursing quality improvement program focused on educating patients and their family members about diet, medications, activity restrictions and anatomy and physiology in hopes of improving compliance. While the effects of the program were not statistically tested, the authors reported that 120 patients in the program had a readmission rate of only 2% with average charges per readmission of $7,272.83 compared to $12,004.60 for nonteam patients. They also noted that the program improved patient satisfaction scores.

Fitzgerald and Freedman (1994) conducted a case manager intervention study using education materials and contacts related to patient information to study these interventions in reducing readmission rates. Case managers mailed educational materials to patients 24 hours after discharge and contacted patients within 5 days to review educational materials. Intervention patients had more frequent visits to clinics post

discharge but there was no significant difference between groups in total readmissions. Contacts for education, along with contacts for care and using protocols were ineffective in reducing nonelective readmissions (Fitzgerald, 1994).

On the basis of a study of a neighborhood health clinic, Becker and Maiman (1979) concluded that patients' lack of understanding or knowledge related to their prescribed treatment(s) was an important contributor to compliance. Lack of knowledge and understanding was found in patients' knowing the purpose of their prescribed medications, their prescribed dosages, how often to take the medications, and how long to take their medications. Overall, 73% of the patients, who were able to correctly describe their doctor's instructions, actually complied with the prescribed regimen. Only 16% of the patients, who made one or more mistakes about their doctor's instructions, followed the prescribed regimen. Mulaik (1992), based on a study of 11 triads, each composed of a noncompliant schizophrenic patient, a family member and a primary nurse, concluded that patients and families could benefit from more knowledge of the disease, treatment, signs and symptoms.

The results of Becker and Maiman's (1980) review of 14 different studies on knowledge and understanding were less conclusive. However, they did conclude that providing knowledge to patients who wish to comply but do not have sufficient information, would contribute to compliance and providing less motivated patients with knowledge and information would not contribute to compliance.

Haynes et al. (1976) compared and contrasted 16 educational strategy studies to 20 behavioral studies. They concluded that using both educational and behavioral strategies improved compliance better than using educational strategies alone.

Green (1979) cautioned that many of the studies of the effects of educational strategies often had problems with the understanding and application of educational principles rather than with flaws in the educational strategy. Green (1979) further cautioned that studies and reviews did not define or use the term, education, in a consistent manner. Because information exchange and behavioral approaches used educational techniques, the distinction between educational and behavioral strategies was not clear. Cameron (1996) attributed the contradictory results to the use of a broad range of conceptual and operational definitions for knowledge and understanding.

Although the research on relationships among compliance and knowledge and understanding seems to have produced contradictory results, the results suggested that knowledge and understanding are related to compliance. The implications are that adequate information should be provided to the patients and their caregivers and that instructions and directions should be provided in both verbal and written formats using language understood by the patients and their caregivers.

An interesting, and important consideration, in research on the effect of knowledge and understanding on compliance is the concept of "intelligent noncompliance" (Becker & Maiman, 1980). The health care provider and the health care system seems obligated to assure the patient knows about and understands his/her condition. However, many would argue from an ethical perspective that a patient has the right not to comply for reasons important to him/herself.

Quality of Interaction

Much of the research on quality of interaction (i.e., how well the patient and provider communicate in a manner acceptable to both parties) has focused on the effect of the behavior and attitude of the health care provider and the behavior and attitude of the patient. Coe and Wessen (1965) and Becker and Maiman (1975) concluded that impersonality, brevity of encounter and lack of communication, particularly of an emotional nature, were related to noncompliance.

Gillum and Barsky (1974) found that two-thirds of physicians studied attributed lack of compliance to the uncooperative nature of their patients, and one-fourth attributed the lack of compliance to the attitudes and behaviors of the physicians themselves. Levy (1988) found that satisfaction was related to compliance. Davis and von der Lippe (1968) concluded that the physician's optimism and attitude toward the efficacy of the treatment were related to compliance.

Haynes et al. (1976) found the degree of supervision, a component of the concept of a therapeutic or contingency contract between patient and provider, was related to compliance and corresponding degree of supervision. Similarly, Hare and Willcox (1967) attributed the difference in compliance between day-patients and outpatients to the lack of supervision among outpatients.

Overall, existing research suggests that providers who treat patients as active participants in the treatment process and have favorable attitudes toward actively influencing their patients were more likely to have patients with appropriate health attitudes and compliance behaviors (Becker & Maiman, 1980). These conclusions, however, overlook the patients' attitudes toward the treatment process and view the

patient-healthcare-worker interaction as a one-way model of communication. Patients' attitudes toward being active participants and toward the treatment process are likely to affect the relationship and compliance.

Social Isolation and Social Support

Social isolation and social support, conceptualized as the patient-provider partnership and the family environment (Cameron, 1996) have been found to be related to compliance. Porter (1969) found that living alone contributed to nonadherence among general practice patients who were taking long-term chronic medication. Stuart and Davis (1972) found that weight losers and lost-weight maintainers were more likely to acknowledge help from other family members in cueing and reinforcement than nonlosers and nonmaintainers. On the basis of their review of the literature, Baekeland and Lundwall (1975) concluded that dropping out of treatment was associated with low social support. Haynes' (1976) literature review led to the conclusion that family influence was considerable with supportive families being associated with compliance in five of six studies reviewed. Doherty and Baird (1983) concluded that there was reasonably strong evidence linking family support and patient adherence. Haynes, Taylor and Sackett's (1979) historical review identified a positive relationship between social support and adherence. Ramsey (1989) stated that there is considerable evidence from a variety of investigators, in different settings, using multiple illnesses with many research methods, to show that the family plays a significant role in the process of caring for an individual.

Compliance research shows that the patient's larger context of family, friends, and social support system offers a significant contribution to compliance, and therefore, to improved health (Fishman, 1995). "Family," a concept Dunbar and Stunkard (1979)

suggested was one of the most promising areas for studies on compliance is discussed more extensively in Chapter 2.

Health Beliefs and Attitudes

Health beliefs and attitudes, for most researchers, have been incorporated into a health belief model (Rosenstock, 1966) that is also reviewed at length in Chapter 2. Becker, Maiman, Kirscht, Haefner, Drachman & Taylor, 1979) concluded that, in general, research in this area showed that patients are more likely to comply when they believe the health care provider is correct; the illness can cause harm; and the prescribed therapy will reduce the risk of death or improve the chance that their health will improve. The multi-faceted nature of the health belief model approach offers strong potential for future research on the prediction and understanding of compliance.

Illness and Treatment

The focus of this area of compliance research has been on the effects of the complexity of the regimen, duration of the prescribed regimen, and requirements for changes in lifestyle (Haynes et al., 1976). While it is often impossible or difficult to alter a particular regimen, Becker (1974) found that reducing complexity, duration, costs, and inconvenience could have a positive effect on compliance. Dunbar and Stunkard (1979) viewed "the regimen itself" as the single most important determinant of compliance. Levy (1988) found that when the degree of change in a patient's lifestyle was reduced, compliance increased. While an illness and its treatment is an important factor in understanding compliance, the potential of this area is limited by the inability to alter particular regimens and control for type of illness. Compliance research on illness and treatment within particular illnesses offers more potential than studying compliance across

illnesses and treatments. Meta-analysis of compliance research offers a potential solution to this challenge.

Interaction of Health Beliefs and Attitudes and Family Interventions: A New Opportunity

Among the five areas of focus for compliance research (Knowledge and understanding, Quality of interaction, Social isolation and social support, Health beliefs and attitudes, and Illness and treatment), two seem to offer the strongest potential for nursing: health beliefs and attitudes and social support. A better understanding of the interaction between health beliefs and attitudes and family interventions should provide nursing direction for the development of strategies to improve compliance.

Unfortunately, the research on patient interventions that include family is limited (Saylor et al., 1990). LaGreca & Schuman (1995) criticized compliance researchers for not including contextual, family and developmental variables. While current nursing practice suggests that nurses consider the involvement of family an important contributor to compliance, there is limited research to support the suggestion that nurses are including the patient's family when planning nursing interventions (Frost, Brueggen & Mangan, 1997). Reasons for not using family in planned interventions are multiple and varied including lack of time, inexperience and/or limited knowledge, short time frame, limited resources, lack of continuity of care and lack of communication between healthcare providers (Frost et al., 1997).

Another, less cited, but more obvious reason for not using family interventions is their lack of importance for a particular patient. When a nurse does not believe an intervention is important for a patient, she/he will not likely give full support to the intervention. An examination of the importance of various family interventions to nurses

for individual patients may provide insight into this problem. Similarly, from a patient quality-of-care perspective, an examination of the differences between what patients' believe is important regarding family interventions and what they believe the nurse actually does may shed light on the effect of family interventions on compliance.

Gap Analysis

Gap analysis (Dyck, 1996) offers a useful approach to the study of the differences between the importance of family interventions to the nurse and the patient and the family interventions nurse actually uses, as perceived by the nurse and the patient. This approach is based on traditional attitude models (Fishbein, 1963; Rosenberg, 1956) and has been used in patient satisfaction research (Brown & Swartz, 1989; Dyck, 1996). The basic notion of gap analysis in quality of health care is that a high quality service effectively and efficiently alleviates health problems to the satisfaction of the patient (Walters & Mangan, 1995). Janda, Wang and Rao (1996), in a study of importance and performance of dental offerings, found significant differences between what was important to patients and what was important to dentists. Level of quality of service was related to patients' perceptions of the actual service compared to what they expected (Dyck, 1996; McAlexander, Kaldenburg & Koenig, 1994; Parasuraman, Zeithaml & Berry, 1986).

Bowen, Stowe and Shumaker (1998) used a gap analysis of what guests at a hotel said were important attributes and the guests' rating of the hotels' performance on those attributes. They suggested that this gap provided direction for building customer loyalty by identifying the attributes upon which the hotel should improve. In a health care setting, Hill and McCrory (1997) compared the importance of various attributes to the perceptions of the hospital's performance (very poor to very good) to identify the importance-

performance gaps related to length of stay in the hospital and whether the patient had previously been a customer of the hospital.

In the context of family interventions, gap analysis suggests that patients are more satisfied and thus more compliant when their expectations regarding family interventions are met. Likewise, nurses are more supportive of family interventions when what they believe is important to an individual patient fits their use of a family intervention.

The results of family interventions that meet both the patient's and nurse's expectations should be a more satisfied patient and a more supportive nurse. The result of a more satisfied patient and a more supportive nurse should be mutual respect and cooperation. Mutual respect and cooperation should lead to compliance.

Problem Statement

The relationship between family interventions and compliance may be found in a gap analysis of the difference between what is important to nurses and patients and how well the nurses and patients perceive that the family intervention is being used. This study was designed to address the following questions:

1. Is there a difference between patients' perceived importance of family nursing interventions and nurses' perceived importance of the same family interventions in a plan of care?

2. Is there a difference between the patients' perception of how well a nurse implements family interventions and nurses' self-evaluation of implementing the same family interventions?

3. Is the difference between the importance of family interventions to patients and patients' ratings of their nurses' performance in implementing the interventions related to how compliant the patients perceive themselves?

4. Is the difference between the importance of family interventions to nurses and nurses' self-rating of their own performance in implementing the interventions related to how compliant nurses perceive their patients?

5. Is the difference between the importance of family interventions to patients and patients' ratings of their nurses' performance in implementing the interventions related to patients' compliance as indicated by measured health indicators?

6. Is the difference between the importance of family interventions to nurses and the nurses' self-rating of their own performance in implementing the interventions related to patients' compliance as indicated by measured health indicators?

Significance for Nursing

Current research on compliance suggested the importance of involving family to increase compliant behavior of patients. Research related to family interventions in nursing practice, however, is limited (Craft & Willadsen, 1992). While nurses recognize the importance of family and agree that psychosocial aspects of care are an important part of their practice, there is limited nursing research demonstrating the actual use of family interventions in clinical practice (Frost et al., 1997). Findings from this study were expected to identify specific family nursing interventions that were:

1. Being used by nurse practitioners;
2. Perceived as important by both the patients and nurses;
3. Performed by nurses as identified by the patients and the nurses themselves; and
4. Related to compliance.

The identification of family interventions actually used in clinical practice was expected to provide the foundation for the development of taxonomy of practical family nursing interventions. Further, the identification of significant correlations between family intervention gaps and compliance was expected to provide indicators of the effectiveness of family interventions. The result would be the beginning of taxonomy of nursing family interventions related to compliance.

CHAPTER 2
LITERATURE REVIEW

Health Belief Model

Among the various areas of compliance research, health beliefs and attitudes and social support offer a strong potential for nursing. Health beliefs and attitudes and social support have been conceptualized with the Health Belief Model (HBM) (Rosenstock, 1966). This multi-faceted model provides a strong framework for the study of health beliefs and attitudes and social support as they affect compliance (Doherty & Baird, 1983). An understanding of patients' and nurses' beliefs and attitudes toward health care regimens and their attitudes toward the use of family interventions should provide a better understanding of compliance and thereby facilitate the development of nursing strategies to enhance compliance.

Components of the Health Belief Model

The Health Belief Model (HBM) (Rosentock, 1966) is a cognitive-motivational model based on work from social psychologists in the 1950s working with a federal research program to explore why people did not accept disease prevention strategies (obtaining immunizations) or screening tests for early detection of preventable or initially asymptotic diseases. Becker and colleagues (Becker, Drachman & Kirscht, 1974; Becker, Maiman, Kirscht, Haefner, Drachman & Taylor, 1979) have done extensive refining and empirical testing of the HBM.

The essential components of the HBM are from the psychological and behavioral theories hypothesizing that behavior is dependent on the "value" placed on a particular goal by an individual and the individual's determination of the change that a given action will achieve that

"goal." In the context of health-related behavior (Clark & Becker, 1998), these components are the desire to avoid disease/illness (or get well if already ill) and the person's "belief" that a particular health behavior will prevent illness (or cure the person). Together these two variables represent the individual's estimation of the threat of the illness and the likelihood of being able to reduce the threat of the illness through some action that the person takes (Schumaker et al., 1990). This approach is consistent with gap analysis (Dyck, 1966). The gap is the difference between the threat and the likelihood of being able to reduce the threat. In terms of family interventions, patients are hypothesized to have different levels of value (importance) for different family interventions and different levels of belief that their nurses actually performed the family intervention (performance). Compliance is hypothesized to be related to how well the nurses' performances fit the patients' expectations (the importance-performance gap).

This model proposes that patients' health beliefs and expectations affect the likelihood that the patients will adhere to prescribed strategies. The beliefs, perceived susceptibility, perceived severity, perceived benefits, and perceived barriers/costs (Figure 2.1) and their structure have been supported by confirmatory factor analysis (Weissfeld, Brock, Kirscht & Hawthorne, 1987).

Perceived Susceptibility

Perceived susceptibility is the extent to which patients believe they will acquire a disease, a person's subjective perception of the risk of contracting a condition (Schumaker et al., 1990). In the situation where the disease has been diagnosed, perceived susceptibility is redefined to include estimates of re-susceptibility, belief in the diagnosis itself, and the overall sense of susceptibility to an illness in general.

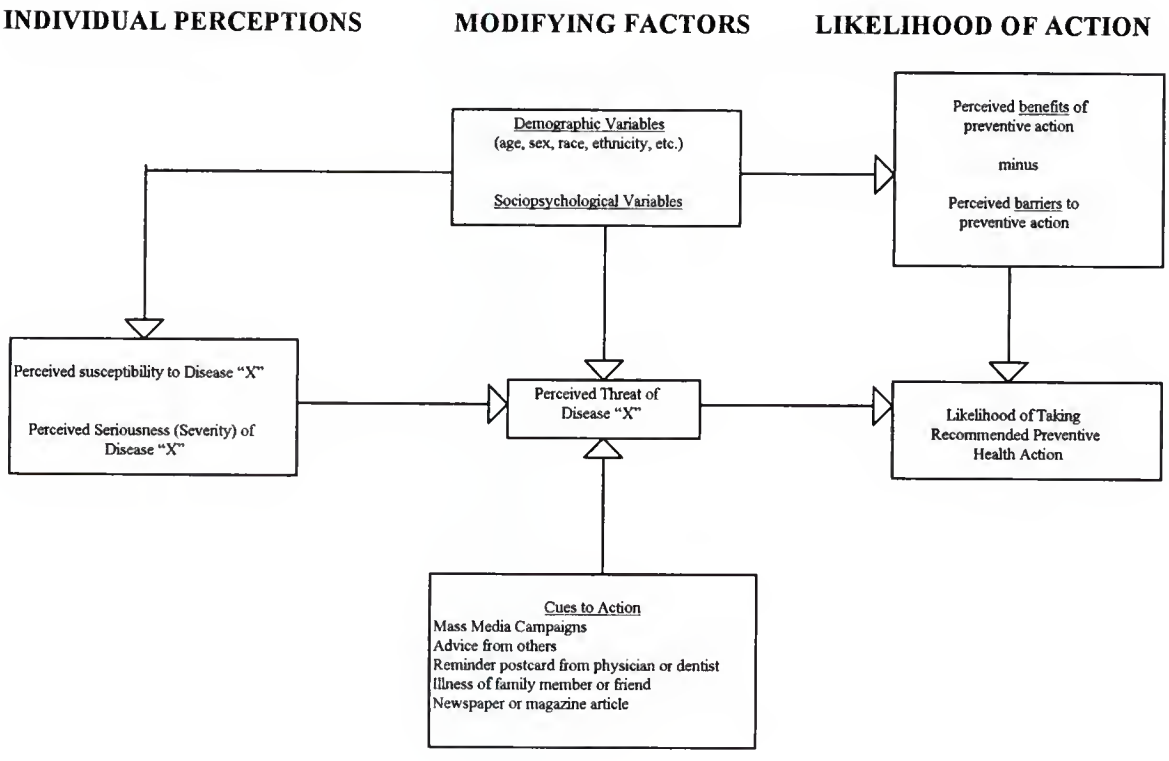

Figure 2-1. The Health Belief Model (Becker, Drachman & Kirscht, 1974).

Perceived Severity

The effects of an individual's perceptions, feelings, and concerns related to the seriousness of getting a disease or leaving it untreated and the anticipated consequences of the disease, including pain, loss of function or death as well as negative social consequences on family and social relations, are referred to as "perceived severity" (Shumaker et al., 1990). Essentially, perceived severity is the patient's assessment of contracting an illness (Doherty & Baird, 1983). Higher levels of perceived severity are more likely than lower levels of perceived severity to lead to compliant behavior.

Perceived Benefits

Perceived benefits refer to the positive outcomes of following a prescribed health regimen or the feasibility and efficacy of following various actions (Doherty & Baird,

1983). While acceptance of personal susceptibility to a condition one thinks is serious may lead to behavior, it does not define the particular action likely to be taken.

The specific action is dependent upon the perceived effectiveness (benefits) of the actions available to reduce the threat of the disease or condition. A person threatened by a disease or condition would not be expected to act on the health recommendation unless they perceived the action to be effective, or beneficial (Schumaker et al., 1990).

Perceived Barriers/Costs

Perceived barriers and costs refer to the patient's perception of the disadvantages of adhering to the regimen, the perceived negative aspects of following a particular health regimen (Doherty & Baird, 1983). The barriers, or costs, are impediments to acting on a recommended health action or behavior. Compliance is based upon a "cost/benefit" analysis of the perceived positive effects against the perceived negative effects, including expense, dangerous due to side effects, inconvenience, and time required.

Interaction of Components

Essentially, the Health Belief Model proposes that individuals will comply with recommended health regimens when the individuals believe that they are susceptible to the disease or illness, that the results or consequences of the disease/illness or noncompliance are serious, that the action recommended is beneficial or effective in reducing the risk or seriousness of the illness/disease, and that the barriers/costs of action do not exceed the benefits (Schumaker et al., 1990).

These components of the HBM are hypothesized to interact to affect health behavior. The combination of susceptibility and severity levels provides the individual the

energy or necessary force for action. The comparison of perceived benefits to perceived barriers provides direction for specific behavior.

Cues to Behavior

The HBM also includes "cues to action, " stimuli that "trigger" the action, or behavior, by the individual. This trigger makes individuals consciously aware of their feelings about the disease or threat to their state of health (Haynes, Taylor & Sackett, 1979). The cues to action may be internal or external. Internal cues include signs or symptoms of the disease or state of health. External cues include mass media communications or campaigns such as reminder literature, or interpersonal interactions (Schumaker et al., 1990). Demographic and psychosocial variables are in the HBM as they affect an individual's perceived threat, perceived benefits, and perceived barriers (Becker, Maiman, Kirscht, Haefner, Drachman & Taylor, 1979).

Evaluation of the Health Belief Model

Early research on the health belief model suggested that the relationship between health beliefs and compliance may be bi-directional, with health beliefs becoming congruent with actual compliance as well as the reverse of this (Becker et al., 1979). Janz and Becker's (1984) analysis of 46 different Health Belief Model studies found a "significance ratio" for each health belief model dimension. In most cases, each health belief model dimension was significant. The significance ratio orderings for the four dimensions were (1) barriers (89%), (2) susceptibility (81%), (3) benefits (78%), and severity (65%). In concluding their evaluation of the research, Janz and Becker (1984) noted that the health belief model was limited to accounting for the variance in individuals' health-related behaviors that can be attributed to beliefs and attitudes. Janz and Becker

(1984) concluded that the health belief model did not account for habitual behaviors (cigarette smoking), economic factors and/or environmental factors that may prevent compliant behavior. Dunbar-Jacob, Schlenk, Burke and Matthews' (1998) review of cognitive-motivational predictors related to adherence produced similar conclusions. They found strong evidence that susceptibility, perceived severity, perceived benefits, and perceived barriers were related to compliance.

The HBM provided a theoretical framework for this study. The model suggested that nursing family interventions, valued by patients and performed by their nurses, should affect individuals' psychosociological factors and cues to action which in turn should affect patients' perceived susceptibility, perceived severity, perceived benefits, and perceived barriers/costs. The net effect was expected to be compliant patients.

Family and Nursing

Family has long been a topic of research in many disciplines including anthropology, sociology and psychology (Lavee & Dollahite, 1991). This interest stems from the long recognized belief that family is one of the most important contextual influences on human growth and development (Murphy, 1986). The inclusion of family in nursing research occurs primarily in community health, midwifery, and psychiatric settings (Mirr, 1992). Currently, the American Nurses' Association (ANA), the American Association of Critical Care Nurses (AACN), and the Association of Operating Room Nurses (AORN) include family in their standards of care.

Nursing research has focused on a variety of family issues, including family response(s) to illness, disease states or health conditions, health maintenance, and family coping characteristics, family transition states and new family structures, for example,

"blended and intergenerational" families, single parent families, public policy affecting family, and cross-cultural family research (Murphy, 1986, p. 172). Fisher and Ransom's (1995) research as part of the California Family Health Project is a classical example of cross discipline family research. This study produced a typology of families that were significantly different on health and other well-being measures. This typology of family provides a framework for explaining health behavior and developing interventions to promote health-seeking behaviors in families.

Family Care Giving: Theory and Practice

Family care giving, providing assistance and support to one member in the family by another, is a prevalent and regular part of current family research. While this is not a new phenomenon, there is a growing acknowledgement among providers and researchers that recent demographic, economic, and social changes will make family care giving a public and health policy issue of ever increasing importance (Biegel & Schultz, 1999). Family care giving is another example of a family theory concept, requiring the attention of multiple disciplines and professions, including nursing. Currently, care giving intervention programs encompass various modalities and show the need for the development and testing of family interventions across related professions and disciplines.

Historically, family has been part of nursing since Nightingale first identified the concept of nursing. Early in its development, nursing adopted theories of family functioning from sociology and psychology (Whall, 1980). Nursing practice has consistently expected families to play a participatory role in the health and caring for sick family members (Hiestand, 1982). More recently, nursing theory and research has suggested that patients must be viewed in their family context (Murphy, 1986). As health

care evolves in ambulatory, home, and long-term care, the importance of family will increase (Craft & Willadsen, 1992). "Nursing's Agenda for Health Care Reform" published by the American Nurses Association (1991) specifically identified the need for care delivery in schools, workplaces and homes.

Although the early work in family by nurse scholars and researchers incorporated family theories from related disciplines, various nurse theorists, including Neuman, King, Rogers and Roy, have incorporated family as an important and distinct unit in their nursing theories (Craft & Willadsen, 1992). Other nurse theorists, such as Newman, Roberts and Black, have applied their work to families by viewing the family as the patient (Gilliss, 1991).

Nursing interventions related to family are needed now and will be of increasing need in the future (Craft & Willadsen, 1992). Gilliss (1991), concluding that nursing must move beyond the declaration of intentions to include family in nursing practice to the actual demonstration of family nursing and outcomes, proposed eight areas of nursing and family that needed further development in theory, research and practice:

1. The examination and definition of family nursing;
2. The determination of whether a family nurse is a generalist or a specialist practicing nursing;
3. The preparation of the specialist practice in family nursing;
4. The isolation and identification of the phenomena of interest in family nursing, focusing on family as the unit, and what is empirically based;
5. The accumulation of knowledge about families and related nursing practice across all areas in nursing;
6. The establishment of priorities for research in family nursing;

7. The identification of the significant outcomes of family nursing practice; and
8. The evaluation of clinical work and research data for policy implications.

Compliance and Nursing Family Interventions

Historical reviews, such as Haynes, Taylor and Sackett (1979) and Doherty and Baird (1983), concluded that there was reasonably strong research evidence linking family support and patient adherence. Ramsey (1989) reported that there was considerable evidence from a variety of investigators, in different settings, using multiple illnesses with many research methods, to demonstrate that the family plays a significant role in the process of caring for an individual. Fishman (1995) concluded that treating patients in the larger context of the patient's family, friends, and social support system offered a significant contribution to compliance and to improved health. Generally, these studies examined the effects of family interventions (psychosocial support) on the individual patient in the context of family, the effects on and the effects of the family itself, as a unit analysis, and the effects of the family on family interventions.

Effects of Family Interventions on the Individual Patient: Patient in Context of Family

Findings from research on the effects of family interventions on the individual patient provided evidence that family interventions are related to improvements in the health of the individual patient. To understand family interventions in terms of benefit to the individual patient, Droogan and Brannigan (1997) conducted a meta-analysis of twelve studies incorporating psychosocial family-based interventions to improve the relapse rate of schizophrenia patients. They concluded that the rate of relapse could be reduced by psychosocial interventions such as constructing alliances with relatives, reducing adverse family atmosphere, reducing expressions of anger and guilt, maintaining reasonable

expectations of the ill family member, encouraging relatives to set and keep appropriate limits, and enhancing the family's capacity to anticipate and problem solve. On the basis of their study of 157 youths with insulin-dependent diabetes mellitus, Hanson, De Guire, Schinkel and Kolterman (1995) concluded that a family-centered approach to care contributed to desired health outcomes in the youths while increasing positive family functioning and decreasing levels of family-life stress.

Effects of Family Interventions on the Family

Existing research revealed that family interventions have positive effects on families. From the results of their qualitative study designed to examine changes in families during times when a family member was ill, Johnson, Craft, Titiler, Halm, Kleiber, Montogmery, Megivern, Nicholson and Buckwalter (1995) concluded that nurses' implementing family-centered interventions, such as including identification of support systems and initiating role supplementation programs, was associated with the decline in role strain and role overload among family members. In a more recent study, Powers, Goldstein, Plank Thomas and Conkright (2000) tested the effects of interactive sessions designed to encourage and elicit patient's and their families' active involvement in providing and deciding the needed plan of care. Prior to implementation of the "plan of care sessions," the plan of care was reviewed with family members only 50% of the time. After the implementation of the sessions, plans of care were reviewed with family members more than 90% of the time. Patient, family, and nurse interviews revealed that the plans-of-care sessions encouraged patient and family involvement in planning and decision leading to increased patient satisfaction and positive outcomes in the patient (Powers et al., 2000).

Effects of the Family on Family Interventions

Most studies treated family interventions as the stimulus for change, but some researchers examined the effect of the family itself on family interventions. Fink (1995) studied the effect of family resources, including social support and internal family system, family demands, and family well-being. Results showed increased family strain when caring for an ill family member and suggested that outside services (counseling) could help a family cope with the complex situation of having an ill family member. Ford-Gilboe (1997) provided an excellent example of the effects of the nature of the family. The results of the Ford-Gilboe (1997) study provided evidence that family pride, family cohesion, network support, community support, and family income taken together were predictive of the extent of family participation in health-related problem solving and goal attainment behaviors (Ford-Gilboe, 1997).

Family Interventions

Although current research shows positive effects of family interventions, research on the development and testing of family interventions is limited. Published interventions related to family may not mirror the current practice of nursing (Craft & Willadsen, 1992). Determination of family related outcomes and measurements in research was encouraged at a meeting sponsored by the National Center for Nursing Research in 1991. While it might be accepted that nurses should and actually use psychosocial (family) interventions, whether nurses consistently and actually include the family in the treatment plan is unclear.

The results of Chesla's (1996) interpretive phenomenological study of 130 nurses caring for families in critical care units provided evidence of the need for reciprocal knowledge transfer between nurses working in family practice and nurses skilled and

knowledgeable about family interventions. Frost, Brueggen, and Mangan (1997) conducted a survey of nurses to examine the gap between theoretical literature and clinical nursing. The results showed that nurses thought each psychosocial need identified was "quite important" when giving care to cancer patients and their families; yet the nurses believed that they had only a "moderate skill level" for providing interventions for these needs (Frost et al., 1997). Nursing interventions related to family will continue to be required for nursing practice in the future. These specific interventions and their validation and testing are critical to the nursing profession and healthcare consumers (Craft & Willadsen, 1992).

While many nurses accept and embrace models and theories that include family participation, there is limited research on patient interventions that include family (Saylor, Elksnin, Farah & Pope, 1990). Current nursing practice shows that nurses view involvement of family, as it relates to the psychosocial aspect of care of their patient, as an important aspect to assist the patient in being compliant. However, there is limited quantitative research to validate that nurses are including patient's family when planning nursing interventions (Frost et al., 1997). Robinson's (1996) qualitative study is typical of most research in this area. Robinson's (1996) results suggested four specific relational nursing interventions the nurse as the curious listener, the nurse as the compassionate stranger, the nurse as the nonjudgmental collaborator, and the nurse as the mirror of family strengths. The study revealed that the families in the study believed that nurses' relational interventions were helpful to families caring for an ill family member (Robinson, 1996). While informative, these results were not generalizable.

Nurses have a variety of reasons for not including family in planned interventions, including lack of time, inexperience and/or limited knowledge, short time frame, limited resources, lack of continuity of care, and lack of communication between healthcare providers (Frost et al., 1997). Another, less cited, but more obvious reason for not using family interventions is their lack of importance to a particular patient. When a nurse does not believe an intervention is important, she/he will not likely give full support to the intervention. This lack of support or follow-up on an intervention will likely suggest to the patient that compliance is not so important. An examination of the importance of various family interventions to nurses for individual patients may provide insight into this problem. Similarly, from a patient quality of care perspective, an examination of the differences between what patients expect regarding family interventions and what they receive from their nurses may shed light on the effect of family interventions on compliance.

Historically, family has been perceived to be an integral part of nursing. However, in acute care settings, nursing care remains focused on individuals rather than the inclusion of patients and their families (Mirr, 1992). The importance for all nurses, in all settings, to recognize the importance of families in the care of patients is essential in all of today's health care settings.

Currently, discussion on compliance focuses on the expanded view that includes client participation in health care decision, as well as the trend toward health promotion and wellness, rather than the more traditional view of a prescribed regimen by the healthcare provider. This view recognizes that compliance is not the sole responsibility of the patient, but a "by-product" of the interaction between the patient and their healthcare provider (Hays & DiMatteo, 1989). The most cited predictors of patient compliance are

related to a person's health beliefs and expectations, including Rosenstock's Health Belief Model (1966). Although research has been done to identify determinants of and ways to measure compliance, little has been done in the area of developing specific strategies and interventions designed to assist clients in following their healthcare regimens. Nurses are in a unique position to offer interventions to patients that will enhance a client's ability to follow their prescribed regimens (Simons, 1992).

To address the lack of quantitative research on nursing family interventions, Craft and Willadsen (1992) surveyed nurses to determine the specific family interventions nurses were using. Using systems theory and an ecologic framework, Craft and Willadsen (1992) defined family as a social context of two or more people characterized by ". . . mutual attachment, caring, long-term commitment, and responsibility to provide individual growth, supportive relationships, health of members and of the unit, and maintenance of the organization and system during constant individual, family and societal change" (p. 519).

Craft and Willadsen (1992) attempted to identify the nurse family interventions actually being used in a survey of nurses. They constructed their questionnaire on the basis of an extensive literature review and pilot testing of their instrument among educators, researchers and clinical specialists to assure content validity of the family interventions. One hundred and thirty nurse experts on interventions related to family were surveyed. These nurse experts were from diverse health care settings and levels of nurse education with specialty areas including education, administration, ambulatory care, pediatrics, obstetrics, family health, rehabilitation, general medical and surgical nursing, and specialized areas such as Alzheimer and neonatal intensive care units.

The survey instrument included intervention labels, their conceptual definitions, and their defining activities and questions regarding the nurses' practice experience and education. Nurse respondents rated activities for each intervention using a Likert-scale of 1 for "not at all characteristic" to 5 for "very characteristic" of their nursing practice.

Findings clearly showed that nursing interventions related to family could be specified in a way that has universal meaning to nurses in family nursing. In addition, Craft and Willadsen (1992) identified nine general types of specific family nursing interventions:

1. Family support with promotion of family interests and goals;
2. Family process maintenance with minimization of family process disruptive effects;
3. Family integrity promotion with promotion of family cohesion and unity;
4. Family involvement with family participation in the emotional and physical care of the patient;
5. Family mobilization with utilization of family strengths to influence patient's health in a positive direction;
6. Caregiver support with provision of the necessary information, advocacy and support to facilitate primary patient care by people other than health care professionals;
7. Family therapy with interaction with the family as a change agent to move the family toward a more productive way of living;
8. Sibling support with promotion of interests of siblings when a brother or sister experiences an illness; and
9. Parent education with provision of assistance to help parents understand and help their adolescent children.

Need for Research on Family Interventions

Craft and Willadsen (1992) concluded that their research was "a beginning" for nursing research on family interventions and that further research was needed. An important "next" step is to understand the relationship between the interventions and

compliance. The interventions clearly fit in the psychosociological and social support aspects of the Health Belief Model. However, the importance and delivery of these interventions as perceived by nurses and their patients is not known. When a nurse does not believe an intervention is important, she/he will not likely give full support to the intervention. This lack of support or follow-up on an intervention will likely suggest to the patient that compliance is not so important. Similarly, from a patient quality of care perspective, an examination of the differences between what patients' believe is important regarding family interventions and what they believe the nurse actually does may shed light on the effect of family interventions on compliance. A useful approach to the study of the differences between the importance of family to the nurse and the patient and the family interventions nurses actually use, as perceived by the nurse and the patient, is gap analysis (Dyck, 1996).

Gap Analysis

Gap theory (Gronoss, 1982; Parasuraman et al., 1985) proposes that consumers' perceptions of service quality result from comparing expectations prior to receiving the service and their actual experience of the service. If consumer expectations are met, service quality is perceived to be satisfactory. The gap is simply the perceptions minus expectations (P - E). This conceptualization is essentially the foundation of the Health Belief Model (HBM). The HBM proposes that health behavior (compliance) is affected by the "value" placed on a particular goal by an individual and the individual's determination of the change that a given action will achieve that "goal" (Rosenstock, 1966).

The P - E perspective has been challenged by Cronin and Taylor (1992 and 1994) and Teas (1993 and 1994) arguing that an unweighted performance-based measure is

more valid than the P - E approach. Further, Cronin and Taylor (1992 and 1994) questioned the validity of measuring expectations contemporaneously with perceptions (i.e., after a service has been consumed rather than before) and the validity of measuring the expectations of consumers who have had no prior experience of a service. Carman (1990) argued that quality is an attitude that may be expressed as: $Q = \sum I_i (P_i - E_i)$ where I is the importance of attribute i; P is the perception of attribute i; and E is the expectation of service attribute i. The sum is over the total number of relevant service attributes. Carman (1990) suggested that for most service providers, the importance of a particular attribute is more relevant than its expected level. Furthermore, when the service is new, E may be set to zero. Similarly, Hill and McCrory (1997) suggested that expectations may be inferred from importance ratings. If a consumer believes a service attribute is important, the consumer should expect the quality of that attribute to be good. For these reasons, this study used the P-I (performance – importance) approach. The measures will be taken after the patient has had sufficient contact with the nurse practitioner (service). Conversely, to enhance the interpretation of the data, this study used the more general gap approach of expectations minus performance or I - P rather than the P - I approach. With the I - P approach, the difference indicates performance has not met importance while in the P - I approach the difference indicates performance has exceeded importance. This is the mathematical representation recommended by Parasuraman et al. (1985).

Gap analysis can be used to explain the effectiveness of family interventions (Figure 2-2). Nurses and patients have expectations of family interventions. Patients' levels of satisfaction are dependent upon how well the nurses' performance meets or exceeds their expectations. Likewise, levels of nurses' satisfaction are dependent on how

well the nurses' performance meets or exceeds the nurses' own expectations. Over time, as the nurses' and patients' expectations are confirmed, levels of satisfaction are affected. As levels of expectation are confirmed, satisfaction grows or is reinforced. As expectations are disconfirmed, satisfaction declines, or dissatisfaction increases. Satisfied patients and nurses have positive attitudes toward family interventions. These positive attitudes toward the use of family interventions contribute to compliance because both nurses' and patients' are acting upon interventions in which they both believe. In summary (Figure 2-2), the result of family interventions that meet both the patient's and nurse's expectations should be patients and nurses who are satisfied with nursing family interventions. Satisfaction with the nursing family intervention leads to compliance and a nurse-patient relationship of mutual respect and cooperation.

Hypotheses

The review of theory and research on compliance, the Health Belief Model, nursing family interventions and gap analysis led to the development of six hypotheses tested by this study:

1. Importance of Family Interventions: There will be no difference between patients' perceived importance of family nursing interventions and nurses' perceived importance of the same family interventions in a plan of care.

2. Performance of implementing family interventions: There will be no difference between the patients' perception of how well a nurse implements family interventions and the nurses' self-evaluation of implementing the same family interventions.

3. Patients' gap (importance - performance) = patients' perceived compliance: The difference between the importance of family interventions to patients and patients' ratings of their nurse's performance in implementing the interventions will be related to how compliant the patients perceive themselves to be.

4. Nurses' gap (importance – performance) = nurses' perception of patients' compliance: The difference between the importance of a family intervention to nurses and nurses' self-ratings of their own performance in implementing the interventions will be related to how compliant nurses rates their patients.

5. Patients' gap (importance - performance) = patients' measured compliance: The difference between the importance of family interventions to patients and patients' ratings of their nurse's performance in implementing the intervention will be related to patients' compliance as indicated by measured health indicators.

6. Nurses' gap (importance - performance) = patients' measured compliance: The difference between the importance of family interventions to nurses and nurses' self-rating of their own performance in implementing the intervention will be related to patients' compliance as indicated by measured health indicators.

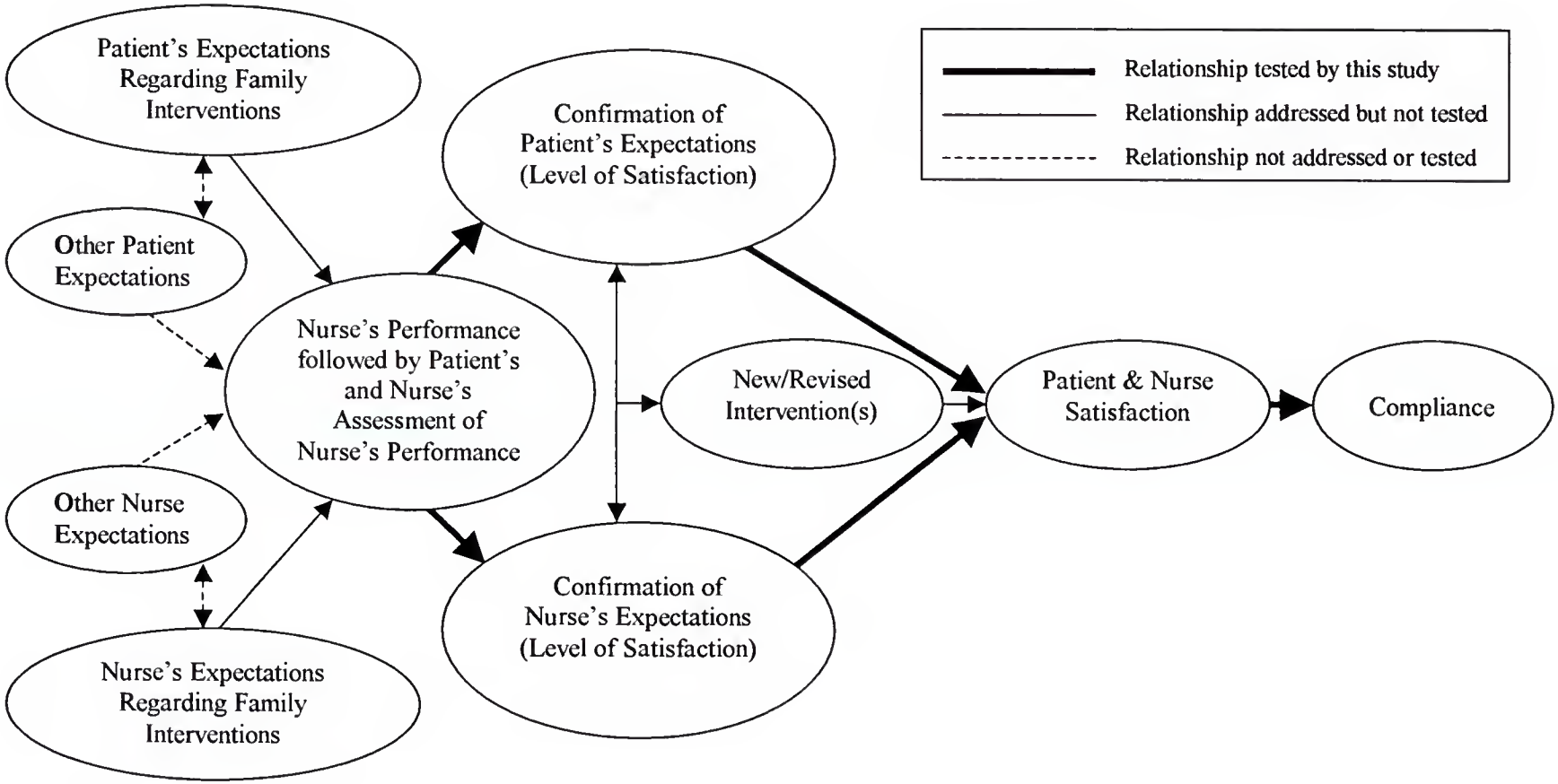

Figure 2-2: Gap Model of Patient's and Nurse's Expectations and Performance Evaluation Leading to Compliance

CHAPTER 3
METHODOLOGY

Purpose of the Study

An *ex post facto/correlational* design (Polit & Hungler, 1999) was used to examine the differences between patients' and nurses' perceptions of importance and nurses' performance of selected family interventions and the relationship among importance and performance gaps for both patients and nurses and direct and in-direct measures of compliance. The major limitation of this design, relative to experimental and quasi-experimental designs, is its ability to reveal casual relationships (Polit & Hungler, 1999). Conversely, the purpose of this study was to examine relationships between a number of variables in a non-artificial setting. This design is well suited to this objective (Polit & Hungler, 1999). Data, collected through a self-administered personal survey of nurse practitioners and their patients conducted between June 1999 and October 1999, were analyzed using the Statistical Package for the Social Sciences (SPSS, 1990). The first step in data entry was to assure that all patients had completed the questionnaire. Fifteen patients and/or the nurse practitioner indicated that the patient had no family or other social support and therefore did not meet this study's criteria. These patients and their corresponding nurse questionnaires were not included in the data analysis. This produced a final sample of 169 patients and 10 nurse practitioners. To assure accuracy of data entry, entered numerical responses were checked against original questionnaires.

Instrumentation: Family Interventions and Their Gaps, The Independent Variables

After a review of the literature and an elimination of duplicate interventions, over 225 possible family interventions for nurses were identified (Craft & Willadsen, 1992; Frost et al., 1997; Snyder, 1995). These 225 interventions provided the initial inventory of family interventions for nurses to be used in this study. The Craft and Willadsen (1992) inventory was the most comprehensive and best structured taxonomy of family interventions. Their inventory included 9 defining family interventions (Family Support, Family Process Maintenance, Family Integrity Promotion, Family Involvement, Family Mobilization, Family Therapy, Care Giver Support, Sibling Support, and Parent Education) and their accompanying activities.

To reduce the identified family interventions to a manageable number for the questionnaire, interventions were included according to the following three criteria:

1. Family interventions must be relevant to this study's patient sample;
2. The interventions must be attributable by the patient to the nurse; and
3. The intervention content validity (ICV) scores from both surveys must average greater than .80 and be among the top three rated interventions.

Relevant to the Patient Sample

Because this study focused on adults with cardiovascular disease and/or diabetes in an outpatient setting, non-related family interventions were deleted. Family interventions related to sibling support and parent education (Craft & Willadsen, 1992) were excluded. Likewise, family interventions related to hospitalization and/or deaths were excluded. This reduced the Craft and Willadsen (1992) family interventions to a set of six defining interventions.

Interventions Attributable by the Patient to the Nurse

Family interventions not directly attributable to the nurse's action(s) were excluded. While Feetham (1984) and Craft and Willadsen (1992) have noted that that it is possible for a nurse's assessment to lead to a family's taking productive actions, such assessments were excluded. For example, a question, such as "What changes have occurred in your family?", provides assessment data and may initiate family self-examination and family problem solving. However, such a serendipitous family behavior may occur without the patient and/or family realizing the action is in response to the nurse's assessment question. The family behavior is productive, but it is not necessarily attributable by the patient to the nurse. Since this study focused on patients' perceptions of nurse behaviors, assessments were excluded. Interventions suggesting "identify" or "determine" were excluded. Only family interventions considered directly attributable by the patient to the nurse were included.

Because the focus of this study was on patients' perceptions of nurse behavior, it was not considered appropriate to ask patients to rate nurse actions that patients would not have the opportunity to observe and rate. Using this criterion, family interventions likely to be known only by the nurse, such as "Incorporate therapeutic use of self as nurse change agent," were excluded. Family interventions between the nurse and family members or caregivers that might not be known by the patient, such as "Explore with the caregiver his or her strengths and weaknesses," were excluded from the family intervention inventory.

Intervention Content Validity (ICV) Scores

Using the first two criteria, family interventions were reduced to a list of over 100 specific actions. All of these were represented in the Craft and Willadsen (1992) inventory. To reduce the number of interventions in this list, the following rules were used with the intervention content validity (ICV) scores reported by Craft and Willadsen (1992):

1. Use intervention activities whose combined ICV scores from both surveys averaged .80 or greater.
2. Use the top three rated interventions from each of the six defining family interventions, family support, family process maintenance, family integrity promotion, family involvement, family mobilization and family therapy.

The resulting inventory of family interventions contained 15 interventions for 6 defining family interventions (Table 3-1). These were the family interventions selected for the gap analysis for this study. Questionnaire instructions and family intervention descriptions were written at a Flesch-Kincaid reading grade level 6.7 (Microsoft Word, 1995). The nurse practitioner questionnaire is presented in Appendix A and the patient questionnaire is presented in Appendix B.

Measurement of the Importance and Performance of Family Interventions, The Independent Variables

Nurses and patients were asked to rate the importance and performance of family interventions on 9-point scales. Importance of family interventions was measured on a 9-point "Not at all Important" to "Very Important" scale. Performance was measured on a 9-point "Never" to "Always" scale. The specific measures are shown in the nurses' questionnaire (Appendix A) and the patients' questionnaire (Appendix B).

Table 3-1: Family Interventions

Family Support Intervention
1. Listen to concerns, feelings and questions of the patient's family
2. Respect and support patient's family's ways of coping
3. Include family members in decision making regarding patient care when appropriate

Family Process Maintenance Intervention
1. Discuss strategies for normalizing family life with family members

Family Integrity Promotion Intervention
1. Establish trusting relationship between nurse practitioner and family members
2. Respect the privacy of individual family members
3. Encourage open communication between family members

Family Involvement Intervention
1. Encourage family members to keep or maintain family relationships as appropriate
2. Provide information to family members about patient in accordance with patient preference
3. Facilitate family understanding of the medical aspects of illness

Family Mobilization Intervention
1. Teach family members ways for health recovery and health maintenance
2. Discuss with patient's family members how strengths and available resources can be used to enhance the patient's health
3. Support family efforts to promote patient's health or management of patient's condition when appropriate

Family Therapy Intervention
1. Encourage family members to recognize and reward positive patient behaviors
2. Facilitate family discussion, as members prioritize data and select the most immediate family issue to address

Factor Analysis of Family Intervention Items

To reduce Type I Error caused by repeated testing across the 15 family interventions (Blalock, 1972) as well as to examine the underlying structure of the family interventions to overcome challenges of multicollinearity, factor analysis was used to identify independent dimensions (combinations) of family interventions and the dependent variables (compliance measures). The results of the factor analyses were used to transform

the original data into statistically independent factors as well as to identify variables that could be used together (summed) in a reliable measure. While representing the original variables, the transformed factor variables were weighted and standardized by factor loadings thereby producing new variables with different metrics than the original raw data. The result is that interpretations can be made to the original theoretical concepts but not to the original scaled values obtained as responses to the questionnaire (Norusis, 1990a).

Separate analyses were conducted on the nurses' importance ratings, the nurses' performance ratings, the patients' importance ratings, the patients' performance ratings, the combined nurses' and patients' importance ratings, and the combined nurses' and patients' performance ratings.

Significance of factor loadings was determined using a criterion recommended by Schlinger (1969). The criterion was $2.58\,(1/\sqrt{n})$ where n is the number of subjects. In this case, with an n of 169, to be significant a factor loading had to be at least .198 (rounded to .20) to be significant.

If items were significantly loaded on two or more factors, Humphrey's Rule (Fruchter, 1954) was used:

1. Square the two significant loadings.
2. Divide the larger squared factor loading by the smaller.
3. If the result of Step 2 is 1.5 or greater, consider the larger loading the more significant. The value of 1.5 means that the larger loading accounts for 1½ as much variance as the smaller. This is similar to an F test which divides one variance by another: where n1 = 50, n2 = 50, F = 1.50 is significant at the .75 level of significance.
4. If the result of Step 2 is less than 1.5, the loadings are confounded. In other words, the item is not significantly loaded on any factor.

The results of these analyses suggested there were two factors underlying the importance and performance ratings. Based upon these findings, separate factor analyses with varimax rotation were completed to identify these two factors such that they were statistically independent variables.

The results of factor analysis with varimax rotation for importance ratings are presented in Table 3-2. The initial, un-rotated, solution provided evidence of two factors. The first factor, as expected, accounted for most of the variance with an eigenvalue greater than one (Table 3-2). The second factor produced eigenvalues of 1.2, .5 and .6. While the .5 and .6 values are less than the typical 1.0 default eigenvalue (Norusis, 1990a), the results of the other factor analysis suggested the default should be ignored. In addition, the size of the factor loadings and clarity of factors supported this decision.

Across the nurse, patient and combined factor analyses, the items were loaded fairly consistently with some confounded loadings. The following items were judged to compose each importance factor:

Factor I (8 items)

1. Listens to concerns, feelings and questions of the patient's family
2. Respect and support the patient's family's ways of coping
3. Include family members in decision making regarding patient care when appropriate
4. Establish trusting relationship between nurse practitioner and family members
5. Respect the privacy of individual family members
6. Provide information to family members about patient in accordance with patient preference
7. Facilitate understanding of the medical aspects of illness
8. Teach family members ways for health recovery and health maintenance

Factor II (7 items)

1. Discuss strategies for normalizing family life with family members
2. Encourage open communication between family members
3. Encourage family members to keep or maintain family relationships as appropriate
4. Discuss with patient's family members how strengths and available resources can be used to enhance patient's health
5. Support family efforts to promote patient's health or management of patient's condition when appropriate
6. Encourage family members to recognize and reward positive patient behaviors
7. Facilitate family discussion, as members prioritize data and select the most immediate family issue to address

The factor analyses of the performance ratings produced similar results to the factor analyses of the importance ratings. The eigenvalues of the initial, un-rotated, factors were greater than one and the eigenvalues of the second factor were .4, .2 and .3, all less than one. More items were confounded in these analyses than in the analyses of the importance ratings (Table 3-3). While some of the items were more obvious members of a particular factor, it was concluded that the items factored together in a similar fashion as they had in the importance factor analyses. Table 3-4 presents items and their factor loadings from the factor analysis of the importance scores and from the factor analysis of the performance scores.

To assess reliability of the proposed scales, Cronbach's alpha (Norusis, 1990a) was calculated (Table 3-5). The results provided alphas in excess of .9, well in excess of the .60 minimum for exploratory research suggested by Hair et al. (1998).

Table 3-2: Factor Analysis with Varimax Rotation of Importance of Family Intervention Items

Item	Nurses		Patients		Total	
	FI	FII	FI	FII	FI	FII
Listens to concerns, feelings and questions of the patient's family	.44	.77*	.55	.80*	.82*	.49
Respect and support the patient's family's ways of coping	.36	.71*	.70[C]	.67[C]	.74*	.58
Include family members in decision making regarding patient care when appropriate	.65	.63	.61	.75*	.76*	.58
Discuss strategies for normalizing family life with family members	.85*	.34	.85*	.49	.45	.86*
Establish trusting relationship between nurse practitioner and family members	.28	.77*	.69[C]	.69[C]	.77*	.55
Respect the privacy of individual family members	.34	.63	.62	.75*	.78*	.54
Encourage open communication between Family members	.85*	.36	.85*	.49	.48	.84*
Encourage family members to maintain Family relationships as appropriate	.82*	.37	.83*	.51	.48	.84*
Provide information to family members about patient in accordance with patient preference	.19	.82*	.47	.86*	.87*	.40
Facilitate understanding of the medical aspects of illness	.55	.72*	.51	.85*	.84*	.49
Teach family members ways for health recovery and health maintenance	.69*	.56	.53	.81*	.77*	.56
Discuss with patient's family members how strengths and available resources can be used to enhance patient's health	.83*	.33	.72[C]	.63[C]	.59	.73*
Support family efforts to promote patient's health or management of patient's condition when appropriate	.76*	.52	.77*	.60	.65[C]	.72[C]
Encourage family members to recognize and reward positive patient behaviors	.84*	.28	.80*	.56	.52	.81*
Facilitate family discussion, as members prioritize data and select the most immediate family issue to address`	.88*	.36	.70[C]	.67[C]	.59	.74*
Eigenvalue**	10.3	1.2	13.8	.5	13.1	.6
% of Variance**	68.9	8.2	91.9	3.0	87.6	4.0

*Significant (greater than .20 and accounts for 1.5% more variance than other loading).
[C]Confounded loadings: Both significant, but not significantly different from each other.
**_Eigenvalue_ and corresponding _% of variance_ report the results of the initial, un-rotated, factor solutions, not the rotated solution.

Table 3-3: Factor Analysis with Varimax Rotation of Performance of Family Intervention Items

Item	Nurses		Patients		Total	
	FI	FII	FI	FII	FI	FII
Listens to concerns, feelings and questions of the patient's family	.85*	.49	.76*	.64	.79*	.59
Respect and support the patient's family's ways of coping	.73[C]	.64[C]	.70[C]	.69[C]	.73*	.65
Include family members in decision making regarding patient care when appropriate	.83*	.47	.74[C]	.66[C]	.77*	.59
Discuss strategies for normalizing family life with family members	.49	.84*	.61[C]	.79[C]	.56	.80*
Establish trusting relationship between nurse practitioner and family members	.76*	.59	.76[C]	.64[C]	.76*	.61
Respect the privacy of individual family members	.76*	.60	.82*	.56	.81*	.56
Encourage open communication between Family members	.65[C]	.70[C]	.58	.81*	.60	.77*
Encourage family members to keep or maintain family relationships as appropriate	.56	.80*	.57	.81*	.57	.80*
Provide information to family members about patient in accordance with patient preference	.83*	.51	.82*	.57	.82*	.54
Facilitate understanding of the medical aspects of illness	.79*	.55	.81*	.58	.82*	.54
Teach family members ways for health recovery and health maintenance	.71[C]	.63[C]	.78*	.62	.76*	.62
Discuss with patient's family members how strengths and available resources can be used to enhance patient's health	.70[C]	.67[C]	.61	.79*	.66[C]	.73[C]
Support family efforts to promote patient's health or management of patient's condition when appropriate	.79*	.57	.66[C]	.72[C]	.73[C]	.65[C]
Encourage family members to recognize and reward positive patient behaviors	.49	.86*	.59	.80*	.55	.83*
Facilitate family discussion, as members prioritize data and select the most immediate family issue to address	.68[C]	.65[C]	.74[C]	.66[C]	.70[C]	67[C]
Eigenvalue**	13.6	.4	14.5	.2	14.1	.3
% of Variance**	90.7	2.6	96.5	1.6	94.1	1.8

*Significant (greater than .20 and accounts for 1.5% more variance than other loading).

[C]Confounded loadings: Both significant, but not significantly different from each other.

**_Eigenvalue_ and corresponding _% of variance_ report the results of the initial, un-rotated, factor solutions, not the rotated solution.

Table 3-4: Nurses' and Patients' Importance and Performance Factor Loadings Analysis

Family Interventions Items: Factor I (8 items)	Combined Nurses & Patients Total Factor Loadings	
	Importance	Performance
Provide information to family members about patient in accordance with patient preference	.87*	.82*
Facilitate understanding of the medical aspects of illness	.84*	.79*
Listens to concerns, feelings and questions of the patient's family	.82*	.79*
Respect the privacy of individual family Members	.78*	.81*
Establish trusting relationship between nurse practitioner and family members	.77*	.76*
Teach family members ways for health recovery and health maintenance	.77*	.76*
Include family members in decision making regarding patient care when appropriate	.76*	.77*
Respect and support the patient's family's ways of coping	.74*	.73*
Family Interventions Items: Factor II (7 items)	Combined Nurses & Patients Total Factor Loadings	
	Importance	Performance
Discuss strategies for normalizing family life with family members	.86*	.80*
Encourage family members to keep or maintain family relationships as appropriate	.84*	.83*
Encourage open communication between family members	.84*	.77*
Encourage family members to recognize and reward positive patient behaviors	.81*	.83*
Facilitate family discussion, as members prioritize data and select the most immediate family issue to address	.74*	.67[C]
Discuss with patient's family members how strengths and available resources can be used to enhance patient's health	.73*	.73*
Support family efforts to promote patient's health or management of patient's condition when appropriate	.72*	.65

Table 3-5: Cronbach's Alpha and Alpha if Item Deleted for Family Intervention Factors

Family Interventions Items: Factor I (8 items)	Patient Factor I: Alpha if item deleted		Nurse Factor I: Alpha if item deleted	
	Importance	Performance	Importance	Performance
Listens to concerns, feelings and questions of the patient's family	.9201	.9965	.9893	.9520
Respect and support the patient's family's ways of coping	.9297	.9973	.9900	.9514
Include family members in decision making regarding patient care when appropriate	.9205	.9966	.9895	.9535
Establish trusting relationship between nurse practitioner and family members	.9293	.9965	.9897	.9524
Respect the privacy of individual family members	.9386	.9965	.9891	.9528
Provide information to family members about patient in accordance with patient preference	.9322	.9965	.9898	.9547
Facilitate family understanding of the medical aspects of illness	.9169	.9966	.9891	.9534
Teach family members ways for health recovery and health maintenance	.9229	.9965	.9901	.9834
Standardized Alpha	.9344	.9970	.9909	.9545

Table 3-5 continued.

Family Interventions Items: Factor II (7items)	Patient Factor II: Alpha if item deleted		Nurse Factor II: Alpha if item deleted	
	Importance	Performance	Importance	Performance
Discuss strategies for normalizing family life with family members	.9881	.9943	.9564	.9845
Encourage open communication between family members	.9884	.9944	.9553	.9827
Encourage family members to keep or maintain family relationships as appropriate	.9889	.9948	.9563	.9829
Discuss with patient's family members how strengths and available resources can be used to enhance patient's health	.9898	.9940	.9611	.9837
Support family efforts to promote patient's health or management of patient's condition when appropriate	.9883	.9953	.9615	.9840
Encourage family members to recognize and reward positive patient behaviors	.9878	.9942	.9601	.9827
Facilitate family discussion, as members prioritize data and select the most immediate family issue to address	.9894	.9955	.9539	.9842
Standardized Alpha	.9903	.9954	.9659	.9859

Gap Scores: Independent Variables

To control for the effect of multicollinearity, factor analysis was conducted on the gap scores calculated by (Teas, 1994): Gap = -1(Importance - Performance). The resulting factors were transformed into statistically independent variables. These factor variables

were utilized as independent variables in a multiple regression whose dependent variable would be patient's perceptions of their own compliance, the nurse's perception of the patient's compliance, and the measured health indicators of compliance. The resulting regression coefficients provided evidence of the amount of variance in compliance explained by each family intervention factor. To explore the dimensionality of the gap scores, factor analysis with a varimax rotation was used. The results (Table 3-6) provided evidence of two factors. The resulting factors, while less clearly loaded as they were in the factor analysis of the importance scores and in the factor analysis of the performance scores, produced similar factors as in the factor analyses of the importance and performance items. Factor I was related to teaching and Factor II was related to support and helping families develop strategies (Table 3-7). Factor scores for each of these two gap factors were calculated and utilized to minimize multicollinearity effects in the multiple regressions on compliance measures

Indicators of Compliance: The Dependent Variables

Compliance, measured from three perspectives: as perceived by the patient (an indirect measure), as rated by the nurse (indirect indicator), and as indicated by measured health indicators (direct indicator), was the dependent variable. Patients' perceived compliance was measured by across four items, medication, diet, and exercise along with a single overall subjective self-evaluation of compliance. Patients' rated their compliance on each item on a 9-point "Never" to "Always" scale (Appendix B). Nurses' perceived patient compliance was measured across the same four items as used for patients (Appendix A). The difference was that this measure asked nurses to rate how well the patients followed their recommendations on a 9-point "Never' to "Always" scale.

Table 3-6: Factor Analysis of Gap Scores

Item	Nurses		Patients		Total	
	FI	FII	FI	FII	FI	FII
Listens to concerns, feelings and questions of the patient's family	.58	.74*	.57	.76*	.65[C]	.67[C]
Respect and support the patient's family's ways of coping	.88*	.40	.70[C]	.64[C]	.58	.74*
Include family members in decision making regarding patient care when appropriate	.47	.81*	.62[C]	.72[C]	.71[C]	.60[C]
Discuss strategies for normalizing family life with family members	.67[C]	.60[C]	.85*	.48	.79*	.51
Establish trusting relationship between nurse practitioner and family members	.77*	.54	.65[C]	.69[C]	.60	.74*
Respect the privacy of individual family Members	.90*	.38	.56	.78*	.48	.85*
Encourage open communication between family members	.50	.81*	.86*	.46	.85*	.46
Encourage family members to maintain family relationships as appropriate	.74*	.59	.85*	.44	.75*	.56
Provide information to family members about patient in accordance with patient preference	.77*	.57	.43	.87*	.51	.82*
Facilitate understanding of the medical aspects of illness	.78*	.55	.45	.87*	.51	.82*
Teach family members ways for health recovery and health maintenance	.73*	.58	.53	.80*	.60[C]	.73[C]
Discuss with patient's family members how strengths and available resources can be used to enhance patient's health	.62[C]	.67[C]	.74*	.60	.76*	.56
Support family efforts to promote patient's health or management of patient's condition when appropriate	.56	.80*	.72[C]	.60[C]	.75*	.59
Encourage family members to recognize and reward positive patient behaviors	.70[C]	.63[C]	.79*	.56	.75*	.59
Facilitate family discussion, as members prioritize data and select the most immediate family issue to address`	.35	.87*	.68[C]	.67[C]	.80*	.48
Eigenvalue**	12.7	.6	13.2	.6	13.3	.4
% of Variance**	84.9	4.2	88.3	3.7	86.9	2.9

*Significant (greater than .20 and accounts for 1.5% more variance than other loading).
[C]Confounded loadings: Both significant, but not significantly different from each other.
**_Eigenvalue_ and corresponding _% of variance_ report the results of the initial, un-rotated, factor solutions, not the rotated solution.

Table 3-7: Gap Factors and Their Factor Loadings

Item	Nurses		Patients		Total	
Gap Factor I: Teaching	FI	FII	FI	FII	FI	FII
Respect the privacy of individual family Members	.90*	.38	.56	.78*	.48	.85*
Facilitate understanding of the medical aspects of illness	.78*	.55	.45	.87*	.51	.82*
Provide information to family members about patient in accordance with patient preference	.77*	.57	.43	.87*	.51	.82*
Teach family members ways for health recovery and health maintenance	.73*	.58	.53	.80*	.60[C]	.73[C]
Establish trusting relationship between nurse practitioner and family members	.77*	.54	.65[C]	.69[C]	.60	.74*
Gap Factor II: Support	FI	FII	FI	FII	FI	FII
Encourage open communication between family members	.50	.81*	.86*	.46	.85*	.46
Discuss with patient's family members how strengths and available resources can be used to enhance patient's health	.62[C]	.67[C]	.74*	.60	.76*	.56
Support family efforts to promote patient's health or management of patient's condition when appropriate	.56	.80*	.72[C]	.60[C]	.75*	.59
Facilitate family discussion, as members prioritize data and select the most immediate family issue to address	.35	.87*	.68[C]	.67[C]	.80*	.48

Reliability of the Subjective (Perceived or Indirect) Evaluation of Compliance Scale

The standardized Cronbach's alpha for the Nurses' Subjective (indirect) Evaluation of Compliance was .906 (Table 3-8), well in excess of the general lower limit of .70 and in excess of the .60 for exploratory research suggested by Hair et al. (1998). However, the "alpha if item deleted" for Medications was .921 indicating that deleting this item from the scale would improve the standardized alpha.

Similar results occurred for the Patients' Subjective (indirect) Evaluation of Compliance items (Table 3-9). The overall standardized alpha for the scale was .618 in

excess of the minimum .60 for exploratory research. The "alpha if item deleted" for Medications was .647 indicating the standardized alpha would improve if Medications were deleted from the scale.

Table 3-8: Cronbach's Alpha for Nurses' Subjective (Indirect) Evaluation of Compliance Items

How well does this patient follow your recommendations for (1 = Never and 9 = Always):	Mean	Alpha if Item Deleted
Diet	6.70	.839
Exercising	6.65	.870
Medications	7.60	.921
Overall, how well does this patient follow your prescribed health regimens	7.18	.850
TOTAL	7.03	Std. Alpha =.906

Table 3-9: Cronbach's Alpha for Patients' Subjective (Indirect) Evaluation of Compliance Items

How well do you follow your nurses' recommendations for (1 = Never and 9 = Always):	Mean	Alpha if Item Deleted
Diet	6.08	.367
Exercising	6.62	.413
Medications	8.10	.647
Overall, how well doe you follow your nurse's Recommendations	8.01	.563
TOTAL	7.38	Std. Alpha =.618

Factor analysis was conducted to explore the underlying structure of the subjective evaluation of compliance items for both nurses and patients. The results, based upon the "alpha if item deleted" scores, were expected to produce at least two factors. The results of this analysis confirmed this possibility (Table 3-10). Diet and Exercising were significantly loaded together for both nurses and patients. Likewise, Medications was significantly loaded on a separate factor. The overall measure was confounded for nurses and loaded on Factor I for patients. Based upon these results, two separate indicators of subjective compliance were calculated using the original scale values. The Nonmedication

Scale was calculated by adding Diet and Exercise ratings and dividing by two (to convert the sum to the original scale values). The original Medications rating was used for the Medications Scale. Separating medication from nonmedication compliance items was supported by the factor analysis of the objective evaluation of compliance items. The overall rating was not used because of its confounded nature. Factor scores, individual scores weighted by factor loadings, were generated for the two perceived compliance scales (Perceived Compliance Factor I Nonmedication Regimens and Perceived Compliance Factor II Medication Regimen) to be used in the multiple regression. These scores, while not in the same scale value as in the original question, are composites of all the items in the scale, weighted by their contribution to the factor (factor loading). As a result, there were two indicators of patient perceived or subjective compliance. The first was a summed measure based upon original scale values. The second was the factor score, the sum of the weighted scores of the original scale values.

Table 3-10: Varimax Rotation of Nurses' and Patients' Subjective Evaluation of Compliance Items

How well does this patient follow your recommendations for... (1 = Never and 9 = Always):	Nurse Factor I	Nurse Factor II	Patient Factor I	Patient Factor II
Diet	.90*	.35	.80*	.19
Exercising	.93*	.26	.88*	-.11
Medications	.25	.95*	.07	.96*
Overall, how well does this patient follow Your prescribed health regimens	.64[C]	.69[C]	.60*	.37
Eigenvalue**	3.14	.58	1.91	.96
% of Variance**	78.51	14.52	47.82	24.07

*Significant (greater than .20 and accounts for 1.5% more variance than other loading).
[C]Confounded loadings: Both significant, but not significantly different from each other.
**_Eigenvalue_ and corresponding _% of variance_ report the results of the initial, un-rotated, factor solutions, not the rotated solution.

Reliability of the Measured (Pseudo-Direct) Evaluation of Compliance Scale

Compliance was also assessed among nurses using a pseudo-direct measure. These measured health indicators were vital sign readings, lab reports, weight, medication regimen, dietary intake and exercise regimen along with the nurse's overall subjective rating of the patient's health. The measures are considered direct because the nurse practitioner completed the patient's questionnaire after the patient's current visit and evaluation had been completed. While there is no guarantee the nurse specifically examined the patient's chart, this approach assured the nurse's familiarity with the patient's current status. Each items was measured on a 9-point scale from "Not Improved" to "Improved as much as I can expect" (Appendix A). The Cronbach's alpha for the nurses' observed compliance was .935, well in excess of the lower limit of .70 (Table 3-11) suggested by Hair et al. (1998). However, because of the performance of the Medications rating in the subjective evaluation scale, factor analysis was used to explore the underlying structure of the scale's items.

Table 3-11: Cronbach's Alpha for Nurses' Pseudo-Direct Evaluation of Compliance

How well does this patient follow your recommendations for (1 = Not improved and 9 = Improved as much as I can expect):	Mean	Alpha if Item Deleted
Vital signs	7.05	.925
Lab reports	7.08	.928
Weight	6.24	.919
Medication regimen	7.29	.922
Dietary intake	6.56	.909
Exercise regime	6.60	.916
Overall health	6.92	.914
TOTAL	6.82	Std. Alpha =.935

The results of this factor analysis (Table 3-12) provided evidence that the objective scale items should also be split into two items rather than treated as a single factor. While the overall indicator was confounded, Weight, Dietary Intake and Exercise regime clearly factored together as did Vital Signs, Lab Reports and Medication regimen. Given that Medications factored alone in the Subjective Evaluation of Compliance scale and that Medications factored with similar items among the observed evaluation of compliance items, the observed evaluation items were divided into two separate indicators of objective evaluation. First, the nonmedication items (Weight, Dietary Intake and Exercise Regimen) were summed and divided by three (to convert the sum to the original scale) to create the Measured (Pseudo-Direct) Nonmedication Evaluation of Compliance Scale. The medication-related items (Vital Signs, Lab reports and Medication regimen) were summed and divided by three (to convert the sum to the original scale) to create the Measured (Pseudo-Direct) Medication Evaluation of Compliance Scale. The overall evaluation item was not used because of its confounded nature. Factor scores, individual scores weighted by factor loadings, were generated for the two objective compliance scales to be used in the multiple regression. These scores, while not in the same scale value as in the original question, are composites of all the items in the scale, weighted by their contribution to the factor (factor loading). As a result, there were two indicators of patient perceived or subjective compliance: a summed measure based upon original scale values and factor scores based upon weighted scores of the original scale values.

Table 3-12: Varimax Rotation of Nurses' Pseudo-Direct Evaluation of Compliance

How well does this patient follow your recommendations for (1 = Not improved and 9 = Improved as much as I can expect):	Nurse Factor I	Nurse Factor II
Vital signs	.32	.84*
Lab reports	.26	.85*
Weight	.85*	.33
Medication regimen	.39	.81*
Dietary intake	.90*	.37
Exercise regimen	.90*	.31
Overall health	.62[C]	.66[C]
Eigenvalue**	5.07	.84
% of Variance**	72.37	11.97

*Significant (greater than .20 and accounts for 1.5% more variance than other loading).
[C]Confounded loadings: Both significant, but not significantly different from each other.
***Eigenvalue* and corresponding *% of variance* report the results of the initial, un-rotated, factor solutions, not the rotated solution.

Summary of Study's Instrumentation: Independent and Dependent Variables

To summarize the study's instrumentation, factor analyses and Cronbach's alphas were used to develop independent and reliable measures of the independent and dependent variables. For hypothesis testing, this study had the following measures:

1. Nurses: Dependent Measures

    a. Subjective Medication Compliance Evaluation Scale: Single item scale: How often does this patient follow your recommendations for medications? Range: 1-9 with 1=Never and 9=Always

    b. Subjective Medication Compliance Evaluation Factor Score Scale: Factor loading weighted scores on all items in the scale, weighted to Medication Compliance.

    c. Subjective Nonmedication Compliance Evaluation Scale: Two-item scale: How often does this patient follow your recommendations for (1) diet and (2) exercise? (Range: 1-9 with 1=Never and 9=Always)

    d. Subjective Nonmedication Compliance Evaluation Factor Score Scale: Factor loading weighted scores on all items in the scale, weighted to Nonmedication Compliance.

e. Pseudo-Direct (Measured) Medication Compliance Evaluation Scale: Three-item scale: Since I began treating this patient, his/her (1) vital signs, (2) lab reports and (3) medication regimen has not or has improved as much as I can expect. (Range: 1-9 with 1=Not Improved and 9=Improved as much as I can expect)

f. Pseudo-Direct (Measured) Medication Compliance Evaluation Factor Score Scale: Factor Score Scale: Factor loading weighted scores on all items in the scale, weighted to Measured Medication Compliance.

g. Pseudo-Direct (Measured) Nonmedication Compliance Evaluation Scale: Three-item scale: Since I began treating this patient, his/her (1) weight, (2) dietary intake and (3) exercise regimen has not or has improved as much as I can expect. (Range: 1-9 with 1=Not Improved and 9=Improved as much as I can expect)

h. Pseudo-Direct (Measured) Nonmedication Compliance Evaluation Factor Score Scale: Factor loading weighted scores on all items in the scale, weighted to Nonmedication Compliance.

2. Patients: Dependent Measures

   a. Subjective Medication Compliance Evaluation Scale: Single item scale: How often do you follow your nurse's recommendations for medications? (Range: 1-9 with 1=Never and 9=Always)

   b. Subjective Medication Compliance Evaluation Factor Score Scale: Factor loading weighted scores on all items in the scale, weighted to Medication Compliance.

   c. Subjective Nonmedication Compliance Evaluation Scale: Two-item scale: How often do you follow your nurse's recommendations for (1) diet and (2) exercise? (Range: 1-9 with 1=Never and 9=Always)

   d. Subjective Nonmedication Compliance Evaluation Factor Score Scale: Factor loading weighted scores on all items in the scale, weighted to Nonmedication Compliance.

3. Nurses and Patients Gap Scores and Gap Factor Scores: Independent Measures
   To compare importance and performance, this study utilized four summed scales identified by the factor analysis. In addition, factor score-created Gap Factors were used as indicators of the importance and performance gaps.

   a. Nurse and Patient Sample
      i. Factor I: Importance Scale 1
      ii. Factor II: Importance Scale 2
      iii. Factor I: Performance Scale 1
      iv. Factor II: Performance Scale 2

b. Nurse and Patient Sample
   i. Factor I: Gap Scale 1
   ii. Factor II: Gap Scale 2

Sample Selection

A two-stage convenience sample provided nurse and patient participants with the objective of completing 20 patient interviews for each of 10 nurse practitioners to meet the study's objectives and provide adequate power for statistical tests (Agresti & Finlay, 1986). First, the principal investigator recruited registered nurse practitioners through letters and personal contacts (Appendix C). Second, the principal investigator and nurse practitioner identified patients who fit the study's criteria:

1. Under treatment for cardiovascular disease (CVD) or diabetes, diagnoses that require multiple interventions. CVD and diabetes are common causes of morbidity and mortality. Dietary management, exercise, medications and lifestyle changes, such as smoking cessation, stress management and weight control, are interventions used to reduce the effects of CVD and diabetes (Phipps, Cassmeyer, Sands & Lehman, 1995).
2. A minimum of three prior scheduled clinic appointments with the nurse practitioner.
3. Patient had a scheduled appointment on the days data were collected.

Although eleven nurse practitioners agreed to participate, 10 nurse practitioners actually participated. One of the volunteers, who had not been in the clinic long enough to have sufficient numbers of patients who met the patient selection criteria, was eliminated. Nine nurse practitioners were female and 1 was male. All were Caucasian. Nine of the practitioners had a master's degree. The other nurse was a post-baccalaureate certified nurse practitioner. All were from Veteran's Administration clinics (6 in Gainesville, 2 in Daytona Beach and 2 in Lake City). The patients were predominantly white males being treated for cardiovascular disease (CVD) or diabetes at the Veteran's clinics used in this study. Results should not be generalized beyond these groups.

Among the 10 nurse practitioners a total of 184 interviews (an average of 18.4 patient interviews per nurse practitioner) were completed with a total of 169 usable patient and corresponding nurse questionnaires (an average of 16.9 usable interviews per nurse practitioner [clinic]) (Table 3-13). This produced a total of 338 questionnaires for analysis (169 patient questionnaires and 169 corresponding nurse practitioner questionnaires). Fifteen completed interviews (8.2% of the 184 total pairs of interviews) were deleted from the analysis because the nurse practitioner reported the patient had no family with whom the nurse practitioner could intervene.

Table 3-13: Completed versus Usable Questionnaires

Nurse	Patients Completing Questionnaire	Patients Without Family or Social Support		Total Patients for Data Analysis	
		#	%	#	%
1	19	-	-	19	100.0
2	19	-	-	19	100.0
3	22	8	36.4	14	63.6
4	13	-	-	13	100.0
5	12	-	-	12	100.0
6	23	-	-	23	100.0
7	15	7	46.7	8	53.3
8	20	-	-	20	100.0
9	22	-	-	22	100.0
10	19	-	-	19	100.0
TOTAL	184	15	8.2	169	91.8

Protection of Human Subjects

Prior to data collection, permission for the study was obtained from the University of Florida's Institutional Review Board and the Subcommittee for Clinical Investigation from the Malcom Randall Veteran's Administration Medical Center, Gainesville. Florida. As directed by the research protocol and for the protection of subjects' confidentiality, informed consent was obtained from all nurses and patients participating in the study.

Statistical Tests

Level of significance for the statistical tests used by this study was .05. This means the study accepted the risk that out of 100 samples, a true null hypothesis would be rejected five times (Polit & Hungler, 1999).

To address the first hypothesis (There is a significant difference between patients' perceived importance of family nursing interventions and nurses' perceived importance of the same family interventions in a plan of care.), patients' ratings of the importance of each family intervention were compared to their nurses' ratings of importance using repeated measures of analysis of variance (Norusis, 1990b).

The second hypothesis (There is a significant difference between the patient's perception of how well a nurse implements family interventions and the nurse's self-evaluation of implementing the same family interventions.) also used the repeated measures analysis of variance (Norusis, 1990b) to compare patients' ratings of their nurses' performance to the nurses' ratings of their own performance.

The third hypothesis (The difference between the importance of a family intervention to patients and patients' ratings of their nurse's performance in implementing the intervention is related to patient's level of perceived compliance.) was addressed by regressing the two patients' importance-performance factor gaps with their ratings of their own compliance (Nonmedication regimen factor and Medication regimen factor) (Norusis, 1990b).

The fourth hypothesis (The difference between the importance of a family intervention to patients and patients' ratings of their nurse's performance in implementing the intervention is significantly related to how compliant the nurse rates their patients'

compliance.) was addressed with the same multiple regression approach used for the third hypothesis. The difference was the source of the ratings. For the fourth hypothesis, the two factors of the nurse's ratings of the importance-performance gap of the family interventions served as the independent variable and the two factors of the nurse's rating of the patient's compliance (nonmedication regimens and medication regimens) were the dependent variables.

The fifth hypothesis (The difference between the importance of a family intervention to patients and patients' ratings of their nurse's performance in implementing the intervention is significantly related to patients' compliance as indicated by measured health indicators.) and the sixth hypothesis (The difference between the importance of a family intervention to a nurse and the nurse's self-rating of their nurse's performance in implementing the intervention is significantly related to patients' compliance as indicated by measured health indicators.) were similar to questions three and four and used multiple regression. The two gap factors were regressed against the two measured-compliance factors (nonmedication regimens and medication regimens) produced by the factor analysis of the measured compliance indicators (e.g., vital signs, lab reports, weight, medication regimen, dietary intake and exercise regimen).

Assumptions of Statistical Tests: Repeated Measures Analysis of Variance

This study utilized a repeated measures analysis of variance (Norusis, 1990b) because the same subject (the nurse-patient pair constitutes a subject) is measured multiple times (importance and performance ratings). This means that patients' and nurses' responses are related as are the importance and performance ratings.

As the name suggests, repeated measures analysis of variance is useful for the analysis of differences between groups when the groups are measured repeatedly or, in essence, compared to themselves (Norusis, 1990b). The issue is that the measures of the dependent variable(s) may be related because they are obtained from the same subjects. This also makes repeated measures analysis of variance useful for this study. Measures of nurses' and their patients' ratings of compliance and importance and performance of family interventions are likely to be related. As a result, repeated measures analysis of variance was used to compare nurses' and patients' ratings.

The major assumptions of the repeated measures analysis of variance (Norusis, 1990b) are that the data are measured at the interval level; the population distributions on the response variable for the groups are normal in form; the standard deviations of the population distributions for the groups are equal; and the groups are independent random samples from the populations being compared (Agresti & Finlay, 1986). The null hypothesis is that population means are equal. Agresti & Finlay (1986) pointed out that analysis of variance is a robust test when considering violations of assumptions, " Moderate departures from normality of the populations and equality of the standard deviations can be tolerated, in the sense that the F distribution still provides a good approximation to the actual sampling distribution of the ratio of the variance estimates" (pp. 405-406). Agresti & Finlay added, "In the special case in which the sample sizes are equal, the F test is particularly robust to violations of the assumption of equal standard deviations" (p. 406). ACITS (1997) suggested that repeated measures ANOVA is robust to violations of the assumptions of multivariate normality and homogeneity of covariance matrices.

Assumptions of Statistical Tests: Multiple Regression

Stepwise multiple regression was the primary method for testing the regression-related hypotheses (Norusis, 1990a). The assumptions underlying multiple regression apply both to the dependent and independent variables and to the relationship as a whole. The analysis of assumption violations must be performed after the regression model has been estimated. The major assumptions to be analyzed are (Hair et al., 1998):

1. Linearity of the phenomenon: There is an assumed linear relationship between the group of independent variables as well as between each independent variable and the dependent variable. Hair et al. (1998) recommended an analysis of partial regression plots between each independent variable and the dependent variable to assess this assumption. A curvilinear pattern of residuals indicates a non-linear relationship (Hair et al., 1998).

2. Constant variance of the error term: This is an assumption of equal variance (homoscedasticity). Hair et al. (1998) recommended plotting the studentized residuals against the predicted dependent variable values and comparing them to a null plot (a random plot of points).

3. Independence of error terms: Regression analysis assumes that each predicted value is independent. In other words, the predictions are not sequenced by any variable. Plots of residuals against possible sequencing variables are useful in identifying non-independence.

4. Normality of the Error Term Distribution: Normal probability plots, which compare standardized residuals to a normal distribution (a straight line), is a useful method for identifying this condition (Hair et al., 1998).

Unlike many other statistical tests, tests for violations of assumptions in multiple regression are performed after the regression model has been estimated. Hair et al. (1998), in describing this approach, wrote, "The basic issue is whether, in the course of calculating the regression coefficients and predicting the dependent variable, the assumptions of regression analysis have been met (p. 172)." This study tested for violations of assumptions by examining studentized residuals, outliers, influential observations and

multicollinearity with the process outlined by Hair et al. (1998). As discussed above, partial regression plots were used to examine the linearity of relationships. The objective of these analyses is to identify cases (nurses or patients), or outliers, that contribute to the violation of the assumptions. These cases are deleted from further model specification (Hair et al., 1998).

To identify outliers, the study used visual inspection of partial regression plots as well as individual leverage values, which indicate the distance between a single case and the center of all observations (Neter, Wasserman and Kutner, 1990). Leverage values were scanned for values greater than 2p/n where p = the number of regression parameters in the regression function including the intercept term and n = sample size (Neter et al., 1990, p.; 394). The typical regression function for this study included the intercept, a dummy variable for marital status, age, and two gaps for a total of five regression parameters with a sample of 169. The leverage value used by this study was .059, rounded to .06.

Studentized deleted residuals were also used to detect outliers. Absolute values of the studentized deleted residuals were compared to a t distribution with n – p –1 degrees of freedom (Neter et al., 1990, p. 400). The t-value for this study was 1.645 at 95% probability with df=169 – 5 – 1.

The influential nature of outlying cases was assessed with Cook's Distance (Neter et al., 1990, p. 403), a measure of the combined effect of a particular case on all of the estimated regression coefficients.

The existence of a multicollinearity effect was determined with the Variance Inflation Factor (VIF). Neter et al. (1990) suggested that a VIF value in excess of 10 for

any of the independent variables was evidence of multicollinearity. This study followed the process suggested by Hair et al. (1998). First, all condition indices above a threshold value of 15, a conservative value (Hair et al., 1998), were identified. Among condition indices exceeding 15, variables with variance proportions above 90% were identified. A .90 or higher between two or more coefficients indicates multicollinearity.

Multicollinearity did not surface as a problem in the analyses conducted in this study. This was in part due to the use of composite factor scores from the factor analyses previously discussed. Since varimax rotation was used, the factor scores produced new scores, the sum of individual scores on the items weighted by the items factor loading (Hair et al., 1998 and Norusis, 1990a), which were statistically independent of each other.

For each regression, the Enter variable entry function was used. This approach, consistent with the hypotheses of this study, enters all variables simultaneously. A second analysis was completed after the data were adjusted for violations of assumptions. In all cases, the first elimination of outliers produced results that were judged to adequately meet the assumptions of multiple regression.

Limitations

The major limitation of this study was that it used a convenience sample of nurse practitioners, who volunteered to participate, from VA clinics in north central Florida. The patients included in this study were those of the nurse practitioner who volunteered to participate and who were scheduled for an appointment on the days data were collected. Neither the nurse practitioners nor their patients were randomly selected. This reduced the ability to generalize to populations outside the study. Because nurses and patients for this study were not randomly selected, generalizations are limited by differences between

nurses' interactions with their patients and differences between nurses used in this study and the population of nurses using family interventions for the sampled patient group. This limitation is somewhat counterbalanced by this study's approach of comparing nurses to their specific patients rather than comparing a sample of nurses to a sample of patients. This comparison of related-samples of nurses and their specific patients was more realistic, but precluded, without substantial time and costs, a traditional random sample.

A second limitation was also related to the study's sample. The sample for the study was a sample of nurse practitioners and their patients. Nine nurse practitioners were female and 1 was male. All were Caucasian. Nine of the practitioners held master's degrees. The other nurse was a post-baccalaureate certified nurse practitioner. All were from Veteran's Administration clinics (6 in Gainesville, 2 in Daytona Beach and 2 in Lake City).The patients were predominantly white males being treated for cardiovascular disease (CVD) or diabetes at the Veteran's clinics used in this study. Results should not be generalized beyond these groups.

The nature of the family intervention items was also a limitation. While created on the basis of substantial research in this area, the items produced very similar results. In other words, the items seemed to measure the same concept. The factor analyses of importance, performance and gap scores revealed at best two independent factors. Fifteen items were reduced to two major factors. This provides evidence that the fifteen items are not unique but, rather, highly related. The mean scores on the items also produced high levels of importance. These two findings suggested that the items were all important and that they represented only two dimensions. The result of this limited the amount of variance in the independent variables. Thus, the amount of variance to be shared with the

dependent variable was reduced limiting the variance that could be explained by Pearson's r or multiple regression. Future research should utilize more variance producing items.

Another obvious, but important limitation to acknowledge is the violations of statistical assumptions. Of particular importance to this study was multiple regression analysis. This analysis requires a subjective evaluation of post-analysis indicators to determine if the data violated key assumptions. While there are statistical indicators of violations (e.g., leverage scores and residual plots), the interpretation of these indicators is subjective, based largely upon the researcher's expertise and experience. A more knowledgeable and/or more experienced researcher may have made different decisions than the principal investigator for this study.

CHAPTER 4
RESULTS

Purpose of the Study

This study used an *ex post facto/correlational* design (Polit & Hungler, 1999) to examine the differences between patients' and nurses' perceptions of importance and nurses' performance of selected family interventions and the relationships among importance and performance gaps for both patients and nurses and alternative measures of compliance. Personal surveys were conducted in a cohort design with nurse practitioners and their patients to assess the perceived importance and performance of nursing family interventions and direct and indirect measures of compliance.

Nurse Practitioner Profile

The nurse practitioners' ranged in age from 28-59 (mean=47) with 5-33 years (mean=24.3) experience in nursing and 2-23 years (mean=7.4) experience as a nurse practitioner. Nine were female and 1 was male. All were Caucasian. Nine of the practitioners held master's degrees. The other nurse was a post-baccalaureate certified nurse practitioner. All the nurse practitioners were from Veteran's Administration clinics in the southeastern United States.

Patient Profile

The sample was predominantly white, married males (96.4%) aged 55-74 (Table 4-1). The minimum number of previous visits was 3, with an average of 7.1 visits, indicating that the sample met the study's criterion that patient subjects had at least three prior visits with their nurse practitioner. Simple one-way analysis of variance provided evidence of significant differences between clinics and patient age and number of previous appointments. A Chi-square test indicated there were different distributions of marital status groups across the clinics. Because of the significant differences between clinics and age of patients and between clinics and numbers of appointments, Pearson correlation coefficients (Table 4-2) were calculated for the relationships among the Nurse Importance Scale I, the Nurse Importance Scale II, the Nurse Performance Scale I, the Nurse Performance Scale II, the Patient Importance Scale I, the Patient Importance Factor II, the Patient Performance Scale I, the Patient Performance Scale II, age; and the number of previous appointments with the nurse practitioner. The assumption was that if the variables were not significantly related, there would be no need to control for age or number of appointments. The Pearson's r for patients' age and Nurses' Performance Scales I and II was significant. Age was therefore included as a covariate in the repeated measures analysis of variance and as an independent variable in the multiple regressions. Number of appointments was not related and therefore not used in the tests of the hypotheses. The differences in marital status was controlled for in the repeated measures of analysis of variance by collapsing the four marital status groups into two independent groups: single patients ($n = 59$) and married patients, including married, widowed and divorced/separated patients ($n = 110$).

Table 4-1: Sample Profile

Age	#	%	ANOVA for Age by Nurse Clinic
26-44	8	4.7	F = 4.739, df = 9, sig. = .000
45-54	26	15.4	High = 89
55-64	43	25.5	Low = 26
65-74	57	33.7	Average = 64.8 Std. Deviation = 11.53
75 and older	35	20.7	
Total	169	100.0	
Gender	#	%	Chi^2 Test for Gender by Nurse Clinic
Male	163	96.4	Chi^2 = 14.189, df = 9, sig. = .116
Female	6	3.6	50% of cells had expected count less than 5.
Total	169	100.0	
Race	#	%	Chi^2 Test for Race by Nurse Clinic
Caucasian	147	87.0	Chi^2 = 26.535, df = 36, sig. = .875
Native American	2	1.2	80% of cells had expected count less than 5.
African-American	13	7.7	
Hispanic	6	3.6	
Other	1	.6	
Total	169	100.0	
Marital Status	#	%	Chi^2 Test for Marital Status by Nurse Clinic
Single	17	10.1	Chi^2 = 41.777, df = 27, sig. = .035
Married	110	65.1	75% of cells had expected count less than 5.
Widowed	14	8.3	
Divorced/Separated	28	16.6	
Total	169	100.0	
# Previous Appointments	#	%	ANOVA for Appointments by Nurse Clinic
3-5	78	46.1	F = 3.954, df = 9, sig. = .000
6-9	49	29.0	High = 7.1
10 or more	42	24.9	Low = 3
Total	169	100.0	Average = 7.1 Std. Deviation = 4.36

Table 4-2: Correlation of Importance and Performance Factors with Age and Number of Previous Appointments with the Nurse Practitioner

	Pearson Correlation Coefficient	
Nurse	Age	Number of Previous Appointments
Importance Scale I	Not Sig.	Not Sig.
Performance Scale I	.229*	Not Sig.
Importance Scale II	Not Sig.	Not Sig.
Performance Scale II	.208*	Not Sig.
Patient	Age	Number of Previous Appointments
Importance Scale I	Not Sig.	Not Sig.
Importance Scale II	Not Sig.	Not Sig.
Performance Scale I	Not Sig.	Not Sig.
Performance Scale I	Not Sig.	Not Sig.

*p<.01

Hypothesis 1: Differences in Importance of Family Interventions

The first hypothesis (There will be significant differences between patients' perceived importance of family nursing interventions and nurses' perceived importance of the same family interventions in a plan of care.) was tested with repeated measures of analysis of variance, with age as a covariate to control for the influence of age. To control for marital status, the analysis of variance compared the Importance Scales I and II scores of single patients, nurses of the single patients, married patients and nurses of the married patients. The test of differences between Importance scores for Scale I (Mean = 7.791) and Scale II (Mean = 7.357) provided evidence of a significant difference in the importance of the factors (Table 4-3). Scale I, Teaching, was more important than Scale II, Strategizing. Age did not have a significant effect as a covariate. The repeated measures test of differences between groups (single patients, nurses of single patients, married patients and nurses of married patients) provided evidence of differences between groups (Table 4-4). Table 4-5 presents the each group's scores for the two scales.

Table 4-3: Repeated Measures Test of Difference between Importance Scales

Source of Error	Type III Sum of Squares	Df	Mean Square	F	Sig.
Importance	1.485	1	1.485	4.376	.037
Scale and Age	.006	1	.006	.177	.674
Importance and Marital Status		3	.006	.002	.910
Error		333	.339		

Table 4-4: Repeated Measures Test of Differences in Importance Scales between Patient and Nurse Marital Groups

Source of Error	Type III Sum of Squares	Df	Mean Square	F	Sig.
Intercept	1317.200	1	1317.200	193.711	.000
Marital Group	4.891	1	4.891	.719	.397
Age	367.249	3	367.249	18.003	.000
Error	2264.340	333	2264.340		

Table 4-5: Means and Confidence Intervals for Importance Scales by Marital Group

Marital Group	FI Importance	FI-Imp 95% C.I.	FII Importance	FII-Imp 95% C.I.
Nurse Single Patient	8.32	7.86-8.78	7.86	7.34-8.37
Nurse Married Patient	8.30	7.97-8.64	7.91	7.53-8.29
Married Patient	8.23	7.89-8.56	7.76	7.38-8.14
Single Patient	6.31	5.86-6.77	5.90	5.39-6.42

Nurses of single patients and single patients did not rate Importance Scale I significantly more important than Importance Scale II. The Scale I mean (8.32) for nurses of single patients was within the 95% confidence interval for the Scale II score (7.34-8.37). Likewise, the Scale I mean for single patients (6.31) was within the 95% confidence interval for the Scale II scores (5.39-6.42). Conversely, married patients and nurses of married patients rated Scale I significantly more important than Scale II. For single patients and their nurses, the importance of Scale I was not significantly greater than Scale II. For married patients and their nurses, Scale I was significantly more important than Scale II.

Nurses of single patients (mean = 8.32), nurses of married patients (mean = 8.30) and married patients (mean = 8.23), rated Scale I significantly as more important than did single patients (mean = 6.31). The ratings for Scale II were the same. Nurses of single patients (mean = 7.86), nurses of married patients (mean = 7.91) and married patients (mean = 7.76) rated Scale II significantly more important that single patients (mean = 5.90) (Figure 4-1). These results, in part, supported the hypothesis. Nurses rated Scale I and Scale II more important than their single patients. Nurses' importance ratings were not different from married patients.

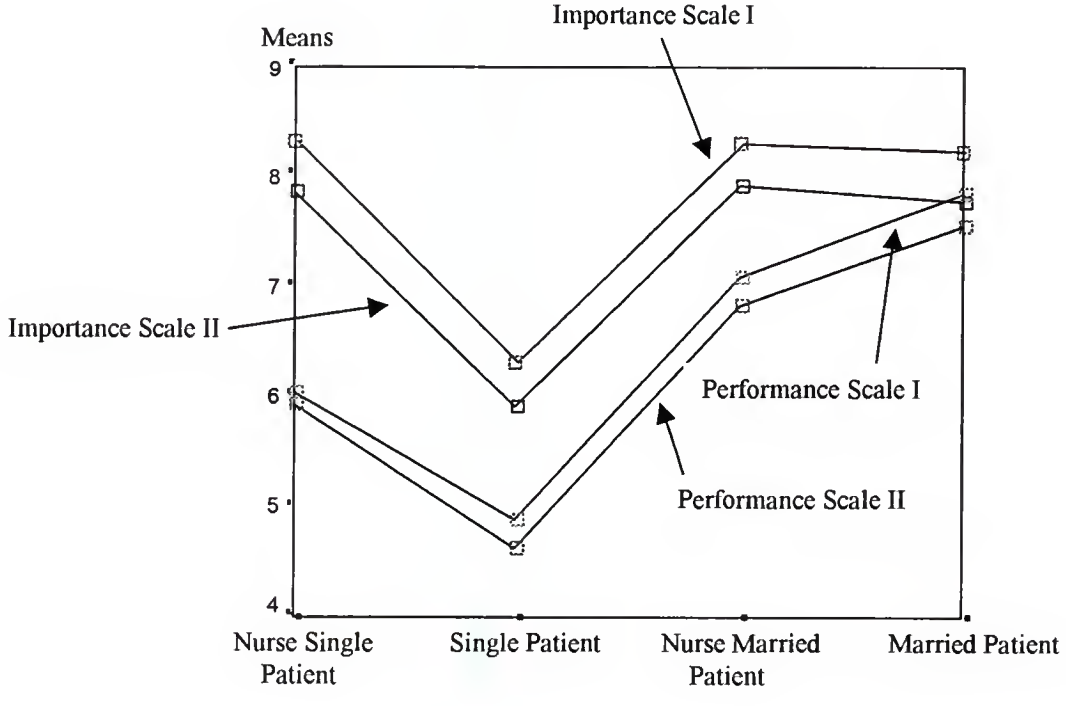

Figure 4-1: Importance and Performance Means

Hypothesis 2: Differences in Performance of Family Interventions

The second hypothesis (There will be significant differences between the patients' perception of how well a nurse implements family interventions and the nurses' self-evaluation of implementing the same family interventions.) was tested with repeated

measures of analysis of variance. There were no significant differences between Performance Scale I and Scale II (Table 4-6). Age was a significant covariate for the between groups analysis, and there were significant differences between the groups (Table 4-7).

Table 4-6: Repeated Measures Test of Difference between Performance Scales

Source of Error	Type III Sum of Squares	Df	Mean Square	F	Sig.
Performance Scale I and II	.007	1	.007	.281	.596
Performance and Age	.006	1	.006	.226	.634
Performance and Marital Status	.525	3	.175	.647	.585
Error	90.020	333	.270		

Table 4-7: Repeated Measures Test of Differences in Performance Scales between Patient and Nurse Marital Groups

Source of Error	Type III Sum of Squares	Df	Mean Square	F	Sig.
Intercept	641.386	1	641.386	40.657	.000
Marital Group	10.673	1	10.673	.677	.411
Age	717.883	3	239.234	15.169	.000
Error	5253.235	333	15.775		

Married patients (mean = 7.84) rated their nurses' performances on Scale I significantly greater than their nurses rated themselves (mean = 7.09) (Table 4-8). Conversely, single patients (mean = 4.88) rated their nurses' performances on Scale I significantly less than the nurses rated themselves (mean = 6.05) (Table 4-8). There were differences between nurses and patients but in unexpected ways. Married patients were higher than their nurses while single patients were lower than their nurses. In other words, married patients believed their nurses were doing more than the nurses believed, and single patients believed their nurses were doing less than the nurses believed (Figure 4-1).

For Scale II, the results were similar. Married patients (mean = 7.55) rated their nurses performance on Scale II significantly higher than the nurses rated themselves (mean = 6.83) (Table 4-8). Likewise, single patients (mean = 4.62) rated their nurses' performance lower than the nurses rated themselves (mean = 5.92) on Scale II (Figure 4-1).

Table 4-8: Means and Confidence Intervals for Performance Scales by Marital Group

Marital Group	FI Performance	FI-Perf 95% C.I.	FII Performance	FII-Perf 95% C.I.
Nurse Single Patient	6.05	5.32-6.78	5.92	5.19-6.65
Nurse Married Patient	7.09	6.56-7.62	6.83	6.30-7.37
Married Patient	7.84	7.31-8.37	7.55	7.01-8.08
Single Patient	4.88	4.15-5.61	4.62	3.89-5.35

Hypothesis 3: Patients' Gaps and Patients' Perceived Compliance

This hypothesis (The difference between the importance of a family intervention to patients and patients' ratings of their nurse's performance in implementing the intervention will be significantly related to how compliant the patients perceive themselves.) was tested with multiple regression. The dependent variables were patients' perceived compliance with nonmedication regimens factor score and patients' perceived compliance with medication regimens factor score. These scores were generated by the factor analysis with varimax rotation and resulting factor loading weighting. The independent variables were Gap Factor I and Gap Factor II. Both of these were also generated by the factor analysis with varimax rotation. They are statistically independent composite variables from the raw gap scores. Age and marital status were also included as independent variables. Marital status was entered as a dummy variable with 0 = not married and 1 = married.

Patients' Perceived Compliance with the Nonmedications Regimens Factor

The initial regression analysis provided evidence of six outliers. The regression with the six outliers deleted produced a non-significant R = .193 (p = .195). While the overall regression was not significant, Patient Gap II (Beta = -.174, p = .029) was significant. A second regression analysis was completed using stepwise variable entry (Table 4-9). This regression was significant (R = -.170, p = .03) with Gap II the only variable entered. The relationship between patients' gaps and compliance was as not expected: as the patients' importance-performance gap for nonmedication regimens widened, compliance increased. This finding did not provide support for the hypothesis. Since both Gap I and Gap II were not significant, the hypothesis was not supported.

Table 4-9: Patient Gap, Patient Age and Marital Status as a Predictor of Patients' Perceived Compliance with the Nonmedication Compliance Factor

$R = -.170$ $R^2 = .029$ Sig. = .03	Beta (Standardized Coefficients)	Significance	Tolerance	VIF
Constant	.066*	.369	NA	NA
Gap II	-.174	.030	.976	1.025
Gap I	-.069	.377	Not in Equation	Not in Equation
Patient Age	.055	.479	Not in Equation	Not in Equation
Marital Status	.011	.893	Not in Equation	Not in Equation

F = 1.532, df = 4, 158
*Not standardized.

Patients' Compliance with the Medication Regimens Factor

With three outliers removed, this regression, patients' gap on patients' compliance with medication regimens, was not significant (Table 4-10). The hypothesis was not supported.

Table 4-10: Patient Gap, Patient Age and Marital Status as a Predictor of Patients' Perceived Compliance with the Medication Compliance Factor

$R = .161$ $R^2 = .026$ Sig. = .376	Beta (Standardized Coefficients)	Significance	Tolerance	VIF
Constant	-.178*	.493	NA	NA
Gap I	-.137	.083	.979	1.022
Gap II	.005	.948	.967	1.034
Patient Age	.088	.271	.961	1.041
Marital Status	-.018	.827	.917	1.091

$F = 1.065$, $df = 4, 161$
*Not standardized.

Hypothesis 4: Nurse' Gaps and Nurses' Perceived Compliance

Hypothesis 4 (The difference between the importance of a family intervention to nurses and nurses' ratings of their performance in implementing the intervention will be significantly related to how compliant the nurses rate their patients.) was tested with multiple regression. The independent variables were nurses' Gap Factor I, nurses' Gap Factor II, age and marital status (dummy variable: 0 = single and 1 = married). The dependent variables were created by the factor analysis with varimax rotation of the nurses' perceived compliance ratings of their patients.

Nurses' Perception of Patients' Compliance with the Nonmedication Regimens Factor

The initial regression of the nurse's subjective evaluation of the patients' nonmedication compliance produced diagnostic results suggesting the deletion of seven cases. The multiple regression with the cases deleted better met the statistical assumptions and produced a significant model with $R = .265$ ($p = .021$) accounting for 7.0% of the variance in the dependent variable, the nurse's subjective evaluation of the patient's nonmedication compliance (Table 4-11). Patient's age (Beta = .193, $p = .017$) was significant: the older the patient, the more likely the nurse was to rate the patient as

compliant with nonmedication regimens. Gap II (Beta = .168, p = .033) was also significant: as the gap increased, compliance increased. This was the predicted relationship. The results suggested a positive relationship. This was attributed to the ideal measure used in this study. The value of this measure was negative for a performance less than importance and positive for a performance that exceeded importance. An analysis of variance comparing nurses who believed their performance either met or exceeded importance to nurses who believed their performances had not met importance was conducted to examine the positive Beta.

The results of the analysis of variance was significant (p = .009, F = 6.929, df = 1, 167). Nurses who met or exceeded importance scores (n = 104) had an average perceived nonmedication compliance score for their patients of 6.95 compare to nurses who had not met expectations (n = 65) of 6.23. The results provided evidence that the significant regression supported the hypothesis: as the gap declined, or exceeded importance, perceived nonmedication compliance increased. These results suggested that a positive Beta indicated that as expectations, or importance, were met, compliance increased. Conversely, a negative Beta indicated that as expectations were not met, compliance increased. These results led to the conclusion that this hypothesis was partially supported because only one Gap was significant.

Nurses' Perception of Patients' Compliance with the Medication Regimens Factor

The initial regression results suggested deleting seven cases. After these cases were deleted, the regression analysis was not significant, R = .236, p = .061 (Table 4-12). Similarly, none of the individual variables were significant. The hypothesis was not supported.

Table 4-11: Nurse Gap, Patient Age and Marital Status as a Predictor of Nurses' Perception of Patients' Compliance with Nurses' Nonmedication Compliance Factor

$R = .265$ $R^2 = .070$ Sig. = .021	Beta (Standardized Coefficients)	Significance	Tolerance	VIF
Constant	-.742*	.071	NA	NA
Patient Age	.193	.017	.919	1.088
Gap II	.168	.033	.926	1.079
Gap I	.004	.959	.931	1.074
Marital Status	-.123	.125	.926	1.079

$F = 2.973$, $df = 4, 157$
*Not standardized.

Table 4-12: Nurse Gap, Patient Age and Marital Status as a Predictor of Nurses' Perception of Patients' Compliance with the Nurses' Medication Compliance Factor

$R = .236$ $R^2 = .056$ Sig. = .061	Beta (Standardized Coefficients)	Significance	Tolerance	VIF
Constant	.052*	.897	NA	NA
Marital Status	.125	.121	.934	1.071
Gap I	.132	.103	.930	1.075
Gap II	.124	.114	.981	1.019
Patient Age	-.031	.703	.934	1.071

$F = 2.307$, $df = 4, 157$
*Not standardized.

Hypothesis 5: Patients' Gaps and Patients' Measured (Pseudo-Direct) Evaluation of Patients' Compliance

This hypothesis (The difference between the importance of a family intervention to patients and patients' ratings of their nurse's performance in implementing the intervention will be significantly related to patients' compliance as indicated by measured health indicators.) was also tested with multiple regression.

Patients' Gaps as Predictors of Nurse's Measured (Pseudo-Direct) Evaluation of Patient's Nonmedication Compliance

The initial regression identified six cases for deletion. The final multiple regression (Table 4-13) was significant ($R = .326$, $p = .001$) but did not support the

hypothesis. The only significant independent variable was age (Beta = .317): as age increased, the more likely the nurse was to rate the patient as compliant on the pseudo-direct measure of nonmedication compliance.

Table 4-13: Patient Gap, Patient Age and Marital Status as a Predictor of Nurses' Measured Evaluation of Patients' Nonmedication Compliance

$R = .326$ $R^2 = .107$ Sig. = .001	Beta (Standardized Coefficients)	Significance	Tolerance	VIF
Constant	-1.541*	.000	NA	NA
Patient Age	.317	.000	.963	1.039
Gap I	-.102	.127	.953	1.049
Gap II	-.027	.560	.954	1.048
Marital Status	-.089	.148	.889	1.124

F = 4.710, df = 4, 158
*Not standardized.

Patients' Gaps as Predictors of the Nurses' Measured (Pseudo-Direct) Evaluation of Patients' Medication Compliance

After deleting the five cases suggested by the diagnostic analyses, the multiple regression of patients' gaps against nurses' measured evaluation of patients' compliance was not significant (Table 4-14). The hypothesis was not supported.

Table 4-14: Patient Gap, Patient Age and Marital Status as a Predictor of Nurses' Measured Evaluation of Patients' Medication Compliance

$R = .138$ $R^2 = .019$ Sig. = .540	Beta (Standardized Coefficients)	Significance	Tolerance	VIF
Constant	-.374*	.373	NA	NA
Gap I	-.006	.936	.977	1.024
Gap II	-.061	.445	.953	1.049
Marital Status	.119	.151	.906	1.104
Patient Age	.050	.528	.966	1.035

F = .780, df = 4, 160
*Not standardized.

Hypothesis 6: Nurses' Gaps and Nurses' Measured (Pseudo-Direct) Evaluation of Patients' Compliance

Hypothesis 6 (The difference between the importance of a family intervention to nurses and the nurses' self-rating of their performance in implementing the intervention will be significantly related to patients' compliance as indicated by measured health indicators.) was addressed with multiple regression. The independent variables were age, marital status, nurses' Gap I and nurses' Gap II. The dependent variables were composite factor variables, measured (pseudo-direct) compliance with nonmedication regimens and measured (pseudo-direct) compliance with medication regimens.

Nurse Gaps as Predictors of the Measured (Pseudo-Direct) Nonmedication Compliance Factor

After five cases were deleted as influential outliers, this regression was significant with an R = .339 (p = .001) (Table 4-15). While the regression was significant, the results did not support the hypothesis. The gaps were not related to the nurse's objective evaluation of the patient's measured medication compliance. The only significant variable was age (Beta = .332, p = .000).

Table 4-15: Nurse Gap, Patient Age and Marital Status as a Predictor of Nurses' Measured Evaluation of Patients' Nonmedication Compliance

$R = .339$ $R^2 = .115$ Sig. = .001	Beta (Standardized Coefficients)	Significance	Tolerance	VIF
Constant	-1.343*	.004	NA	NA
Patient Age	.298	.000	.924	1.082
Gap I	-.016	.551	.734	1.362
Gap II	-.017	.131	.787	1.271
Marital Status	.091	.123	.923	1.083

F = 15.844, df = 4, 159
*Not standardized.

Nurse Gaps as Predictors of the Measured (Pseudo-Direct) Medication Compliance Factor

After deleting the five outliers identified in the initial regression analysis, the regression analysis produced a non-significant R = .237 (p = .055). Gap I was significant (Beta = .212, p = .017). The results of a follow-up stepwise regression (Table 4-16) produced a significant regression (R = 232, p = .003) Gap I produced a significant and positive relationship (Beta = .232, p = .003): as Gap I increased from negative to positive (narrowed), patient compliance increased. Since only one of the gaps was significant, the hypothesis was partially supported.

Table 4-16: Nurse Gap, Patient Age and Marital Status as a Predictor of Nurses' Measured Evaluation of Patients' Medication Compliance

$R = .232$ $R^2 = .054$ Sig. = .003	Beta (Standardized Coefficients)	Significance	Tolerance	VIF
Constant	-.000*	.996	NA	NA
Gap I	.232	.003	1.000	1.000
Gap II	.043	.604	Not in equation	Not in equation
Patient Age	-.009	.906	Not in equation	Not in equation
Marital Status	.027	.738	Not in equation	Not in equation

F = 9.241, df = 1, 163
*Not standardized.

As with the other positive gap Betas, this one was also examined with ANOVA of measured medication compliance scores from nurses who had met or exceeded expectations (n = 123) compared to the measured medication compliance scores from nurses whose performance had not met or exceeded importance scores (n = 46). The results were significant (p = .000, F = 16.622, df = 1, 167). Nurses who met or exceeded importance scores rated their patients measured medication compliance an average of 7.38 compared to an average of 6.54 for nurses who had not met expectations. This provided evidence that as the gap narrowed, measured compliance increased.

CHAPTER 5
SUMMARY, CONCLUSIONS, AND IMPLICATIONS

Summary of Findings

This study used an *ex post facto/correlational* design (Polit & Hungler, 1999) to examine the differences between patients' and nurses' perceptions of importance and nurses' performance of selected family interventions and the relationships among importance and performance gaps for both patients and nurses and alternative measures of compliance. A summary of the major findings of the study is presented below. The reader is reminded that these findings were produced by a convenience sample of nurse practitioners and their patients. Nine of the practitioners were female; 1 was male. Nine held master's degrees, and 1 was a post-baccalaureate certified nurse practitioner. All were from Veteran's Administration clinics (6 in Gainesville, 2 in Daytona Beach and 2 in Lake City). The patients were predominantly white males being treated for cardiovascular disease (CVD) or diabetes at the Veteran's clinics used in this study. Results should not be generalized beyond these groups.

Family Interventions More Relevant to Married Patients and Their Nurse

This study's results showed that nurses and married patients valued family intervention more than single patients. Married patients rated their nurses' performance on family interventions higher than the nurses rated their own performance. Conversely, single patients rated their nurses' performance significantly lower than the nurses rated their own performance.

Patients' Gap Not Related to Patients' Perceived Compliance

Gap II was the only gap significantly related to patients' perceived compliance of with nonmedication regimens. However, the relationship was negative, rather than positive. This did not support the hypothesis. Neither Gap I or Gap II were related to perceived compliance with medication regimens. As a result, the findings of this study did not provide evidence that patients' gaps were related to perceived compliance.

Nurses' Gap II: Strategizing with the Family Related to Nurses' Perceptions of Their Patients' Compliance with Nonmedication Regimens

The nurses' Gap II score, the Strategizing with the Family factor, was related to the nurses' perceptions that their patients were compliant with the nurses' evaluation of their patients' perceived nonmedication compliance. Similarly, patient age was related to nonmedication compliance: as age of the patient increased, the more likely the nurse was to rate the patient as compliant on the perceived nonmedication compliance measure. In terms of patients' and nurses' perceived compliance with medication regimens, there were no significant relationships.

Patients' Gaps Not Related to Nurses' Pseudo-Direct Measures of Compliance

The regressions of the patients' gap scores on the measured (pseudo-direct) evaluation of nonmedication compliance measure indicated that patient age was the only significant predictor: as patient age increased, the more likely the nurse was to rate the patient as compliant on the pseudo-direct measure of nonmedication compliance. None of the variables were significantly related to the nurses' pseudo-direct measures of compliance with medication regimens.

Nurses' Gap I: Teaching the Family Related to Nurses' Pseudo-Direct Measures of Patients' Compliance with Medication Regimens

Nurses' Gap I, Teaching the Family, was the only significant variable in the regression of nurses' gap on nurses' pseudo-direct measures of medication and nonmedication compliance. When the nurses' Teaching gap met or exceeded expectations, the nurse was more likely to rate the patient as compliant with the pseudo-direct measure of compliance with medication regimens.

Conclusions

The purpose of this study was to examine the relationship between family interventions and compliance. A gap analysis, the difference between the importance of family interventions to nurses and patients and the degree to which nurses and patients perceive the family interventions were used by the nurse, was used. Personal surveys were conducted in a cohort design with nurse practitioners and their patients to assess the perceived importance and performance of nursing family interventions and direct and indirect measures of compliance. Data were collected with a convenience sample of nurse practitioners and their patients. Nine of the practitioners were female; 1 was male. Nine held master's degrees, and 1 was a post-baccalaureate certified nurse practitioner. All were from Veteran's Administration clinics. The patients were predominantly white males being treated for cardiovascular disease (CVD) or diabetes at the Veteran's clinics used in this study. Results should not be generalized beyond these groups.

Since only two of the study's four gap hypotheses were only partially supported, there was not substantial evidence to support strong conclusions. However, the results do provide tentative findings, implications for education and practice, and direction for future research in the gap analysis of nursing family interventions.

In general, the results suggested that nurses' perception of their patients' compliance with nonmedication regimens were related to how well the nurse helped the patient's family develop strategies for dealing with the patient's condition (Gap II). Nurses' Gap I, Teaching the Family, was related to nurses' pseudo-direct measures of patients' compliance with medication regimens. Nurses' pseudo-direct measures of compliance with nonmedication regimens were affected only by the patients' age: the older the patient, the more likely the nurse was to rate the patient as compliant with nonmedication regimens.

These results are consistent with the theoretical foundations of this study. Family interventions contribute to compliance when the family interventions meet or exceed patients' and nurses' expectations. In other words, family interventions are likely to have specific functions. The results of this study provided evidence that family interventions related to strategizing with families was important to compliance with nonmedication regimens. Nonmedication regimens for the patients used in this study are familiar to and easily understood by families. On the other hand, the significance of Gap II suggested helping families work with the patient to develop strategies for complying with nonmedication regimens contributed to compliance. Developing these strategies is something with which these families were less familiar and had little experience. Strategizing was thus more important to compliance than teaching. Conversely, Teaching the Family, Nurses' Gap I, was related to the pseudo-direct measures of medication compliance. This also supports the foundation of this study. Practitioners who perceive families are not likely to be familiar with medications and their effects are likely to emphasize "teaching" to achieve compliance.

Implications for Nursing Education and Practice

The results of this study suggested four major implications for nursing education and practice. The first implication is the support for the use of family interventions in building compliance. The next two implications relate to the conceptualization of family interventions and compliance. The results suggested that nursing theory and research may need to treat the concept of family interventions as a more simple concept than it is currently conceived and treat compliance as a more complex concept than it is currently conceived. The fourth implication related to the knowledge gap between patients and their nurses and family intervention theorists and researchers. These two groups have different conceptualizations of family. Reciprocal information transfer should help bridge this gap as well as provide direction for future conceptualizations and measures in family intervention research.

Family Interventions May Contribute to Compliance

While the results do not provide resounding support for the use of family interventions to build compliance, they do provide some support. The literature review, Chapter II, demonstrated that there are a number of factors related to compliant behavior. This study examined only family intervention gaps. It did not control for or measure all factors that might affect compliance. It was not expected that the family interventions alone would account for a large amount of explained variance. This was true. Yet, the family intervention gaps were, in at least two instances, related to different measures of compliance. These significant relationships suggest the opportunity for further development of the gap analysis of nursing family interventions.

Family Interventions May Be More Simple than Currently Conceived

This implication is not based upon the testing of hypotheses but rather on the results of the factor analyses used to construct the measures of the independent variables for the study. The factor analyses of the importance and performance ratings of the family interventions by the patients and nurses and the factor analyses of the family intervention gaps provided evidence that family interventions may be conceptualized more simply than they are. Craft and Willadsen's (1992) research, from which the family interventions used in this study were taken, conceptualized family interventions as having nine different dimensions. This study used items from six of these dimensions. The factor analyses of the patients' and nurses' importance and performance ratings and the factor analyses of the patients' and nurses' gaps produced strong evidence of only two factors, Teaching and Strategizing. These two dimensions simplify family interventions far more than Family Support, Family Process Maintenance, Family Integrity Promotion, Family Involvement, Family Mobilization, and Family Therapy, the six dimensions represented by the items used in this study. These two dimensions provide a more parsimonious perspective for the operationalization and implementation of nursing family interventions in the delivery of health care.

Compliance May Be More Complex than Currently Conceived

This implication, like the second, is not based upon the testing of hypotheses but on the results of the factor analyses used to construct the measures of the dependent variables for the study. The factor analyses of the indirect and pseudo-direct measures of compliance across patients and nurses provided evidence of two strong factors: compliance with medication regimens and compliance with nonmedication regimens.

Implications for Future Research

To continue the development of gap analysis of nursing family interventions, future research should use random samples of different types of nurses and patients with different conditions. While this study focused on ambulatory patients treated on an outpatient basis, future research could focus on patients in greater need of in-home family care. While the development and understanding of each of the nursing family interventions will be developed with random samples of different types of patients and nurses, future research should experimentally test the effectiveness of nursing family interventions. This type of research will enhance the findings of current correlational research.

The last, and perhaps most important, recommendation for future research is the need to develop reliable and valid measures of compliance. The literature review and the factor analyses conducted in this study provide adequate evidence of the need to better understand and measure the concept. Kyngas et al. (2000), in an article published since data analysis for this study was completed, specifically noted the need for an agreed upon conceptual and operational definition of compliance.

Patient compliance has long been and continues to be a major concern in health care (Dahl & Penque, 2000; Kyngas et al., 2000). The Health Belief Model and gap analysis suggest approaches for addressing this challenge. The results of this study provide partial support and direction for future research in the effects of nursing family interventions that meet both the patient's and nurse's expectations.

This suggests that conceiving of compliance, as a single compliant – noncompliant dimension, may be too simple. Compliance should be conceived in terms specific to the desired effect(s) of a health regimen. These effects could range from a change in knowledge or attitude to a specific change in behavior to a specific set of continuous behaviors. Understanding that compliance should be conceived in very specific terms would strengthen research efforts and provide clarity of focus in the practitioners' development and implementation of nursing family interventions.

Patients and Their Nurses May Have a More Simple Conception of Family

Single patients and nurses of single patients generally rated the Teaching and Strategizing family intervention factors lower in importance and lower in performance than married patients and their nurses. This suggested that single persons and their nurses conceived of family in the traditional sense of husband and wife despite the fact that the questionnaire gave instructions for the participants to conceive of family in the more theoretical sense suggested by Craft and Willadsen (1992): a family is a social context of two or more people characterized by mutual attachment, caring, long-term commitment, and responsibility to provide individual growth, supportive relationships, health of members and of the unit, and maintenance of the organization and system during constant individual, family and societal change. While this conceptualization may be theoretically appealing, the single patients and their nurses in this study seemed to complete the questionnaire and live their lives with the more traditional conceptualization of family. These different perspectives should be part of nurse education and practice. Future research should be designed to control for these different perspectives.

APPENDIX A

Nurse's Background and Family Intervention Questionnaire

For background purposes, please answer the following questions about yourself.

1. How old were you on your last birthday? _____

2. Are you (circle) 1. Male 2. Female

3. Would you say you are (circle one):
   1. Caucasian 2. Native American 3. African-American 4. Hispanic
   5. Asian 6. Other

4. What is the level of education you have attained (Circle all that apply)?
   1. Licensed/vocational Practical Nurse(LPN/LVN)
   2. Two-year degree Registered Nurse (ADN)
   3. Diploma Registered Nurse (RN)
   4. Four-year degree Registered Nurse (BSN)
   5. Masters in Nursing-Nurse Practitioner (MSN, ARNP)
   6. Masters in Nursing (MSN)
   7. Other Masters
   8. PhD in Nursing
   9. Other PhD/EDD

5. How many years have you practiced nursing? (Write in total years) _____

6. How many years have you practiced as a nurse practitioner?
   (Write in total years) _____

7. Which of the following best describes your clinical site?
   1. Private clinic
   2. Hospital outpatient clinic
   3. VA outpatient clinic
   4. Private physician's office

This study is exploring the role of families in health care. For the purposes of this study, we are defining a family as two or more persons who care about each other and are committed to a relationship of support and growth. When answering questions about "family," please remember to define "family" as those persons who are committed to and care about each other and their health.

Nurse ID#_____

Patient ID#_____

Importance of Actions

Using a scale of 1 to 9, where 1 is "not at all important" and 9 is "very important," please indicate how important it is to you that you perform in the ways described below in caring for this patient. For example, if it is "very important" to you to listen to the concerns, feelings and questions of this patient's family, you should circle the number 9, "very important." If listening to the concerns, feelings and questions of this patient's family is "not at all important," you should circle the number 1. If you believe listening to the concerns, feelings and questions of this patient's family is neither "important" nor "unimportant," you should circle the number 5, "neutral." If you believe the behavior is between "not at all important" and "neutral," circle 2, 3 or 4. If you believe the behavior rates above "neutral" but not "very important," circle 6, 7 or 8.

	Not at all Important				Somewhat Important			Very Important	
1. Listen to concerns, feelings and questions of the patient's family	1	2	3	4	5	6	7	8	9
2. Respect and support the patient's family's ways of coping	1	2	3	4	5	6	7	8	9
3. Include family members in decision making regarding patient care when appropriate	1	2	3	4	5	6	7	8	9
4. Discuss strategies for normalizing family life with family members	1	2	3	4	5	6	7	8	9
5. Establish trusting relationship between nurse practitioner and family members	1	2	3	4	5	6	7	8	9
6. Respect the privacy of individual family members	1	2	3	4	5	6	7	8	9
7. Encourage open communication between family members	1	2	3	4	5	6	7	8	9
8. Encourage family members to keep or maintain family relationships as appropriate	1	2	3	4	5	6	7	8	9
9. Provide information to family members about patient in accordance with patient preference	1	2	3	4	5	6	7	8	9
10. Facilitate family understanding of the medical aspects of illness	1	2	3	4	5	6	7	8	9
11. Teach family members ways for health recovery and health maintenance	1	2	3	4	5	6	7	8	9
12. Discuss with patient's family members how strengths and available resources can be used to enhance the patient's health	1	2	3	4	5	6	7	8	9
13. Support family efforts to promote patient's health or management of patient's condition when appropriate	1	2	3	4	5	6	7	8	9
14. Encourage family members to recognize and reward positive patient behaviors	1	2	3	4	5	6	7	8	9
15. Facilitate family discussion, as members prioritize data and select the most immediate family issue to address	1	2	3	4	5	6	7	8	9

Nurse's Performance

Using a scale of 1 to 9, where 1 is "never" and 9 is "always," please rate your performance on the following items. If you believe you "never" do one of the listed actions for this patient, you should circle the number 1, "never." If you believe you "always" perform the action for this patient, you should circle the number 9, "always." If you believe you do the described action "sometimes," you should circle the number 5. If you believe you rate above "never" but not "sometimes," circle 2, 3
or 4. If you believe you do the action more "sometimes" but not "always," circle 6, 7 or 8.

	Never			Sometimes				Always	
1. Listen to concerns, feelings and questions of the patient's family	1	2	3	4	5	6	7	8	9
3. Respect and support the patient's family's ways of coping	1	2	3	4	5	6	7	8	9
3. Include family members in decision making regarding patient care when appropriate	1	2	3	4	5	6	7	8	9
4. Discuss strategies for normalizing family life with family members	1	2	3	4	5	6	7	8	9
5. Establish trusting relationship between nurse practitioner and family members	1	2	3	4	5	6	7	8	9
7. Respect the privacy of individual family members	1	2	3	4	5	6	7	8	9
7. Encourage open communication between family members	1	2	3	4	5	6	7	8	9
8. Encourage family members to keep or maintain family relationships as appropriate	1	2	3	4	5	6	7	8	9
9. Provide information to family members about patient in accordance with patient preference	1	2	3	4	5	6	7	8	9
10. Facilitate family understanding of the medical aspects of illness	1	2	3	4	5	6	7	8	9
11. Teach family members ways for health recovery and health maintenance	1	2	3	4	5	6	7	8	9
12. Discuss with patient's family members how strengths and available resources can be used to enhance the patient's health	1	2	3	4	5	6	7	8	9
13. Support family efforts to promote patient's health or management of patient's condition when appropriate	1	2	3	4	5	6	7	8	9
14. Encourage family members to recognize and reward positive patient behaviors	1	2	3	4	5	6	7	8	9
15. Facilitate family discussion, as members prioritize data and select the most immediate family issue to address	1	2	3	4	5	6	7	8	9

16. How often does this patient follow your recommendations:	Never Always				Sometimes				
a. For diet?	1	2	3	4	5	6	7	8	9
b. For exercising?	1	2	3	4	5	6	7	8	9
c. For medications?	1	2	3	4	5	6	7	8	9
d. Overall, how does this patient follow your prescribed health regimens?	1	2	3	4	5	6	7	8	9

17. Since I began treating this patient, his/her…	Not Improved							Improved as much as I can expect	
a. Vital signs have…	1	2	3	4	5	6	7	8	9
b. Lab reports have…	1	2	3	4	5	6	7	8	9
c. Weight has…	1	2	3	4	5	6	7	8	9
d. Medication regimen has…	1	2	3	4	5	6	7	8	9
e. Dietary intake has…	1	2	3	4	5	6	7	8	9
f. Exercise regimen has…	1	2	3	4	5	6	7	8	9
g. Overall health has…	1	2	3	4	5	6	7	8	9

APPENDIX B

Patient's Background and Family Interventions Questionnaire

Nurse ID#_____

Patient ID#_____

For background purposes, please answer the following questions about yourself.

1. How old were you on your last birthday? _____

2. Are you (circle) 1. Male 2. Female

3. What is your race (circle one):
   1. Caucasian 2. Native American 3. African-American
   4. Hispanic 5. Asian 6. Other

4. Are you (circle one):
   1. Single 2. Married 3. Widowed 4. Divorced or Separated

5. Not counting today's appointment, how many scheduled appointments have you had in the past with the nurse you are scheduled to see today? (Write in actual number)_____

This study is exploring the role of families in health care. For the purposes of this study, we are defining a family as two or more persons who care about each other and are committed to a relationship of support and growth. When answering questions about "family," please remember to define "family" as those persons who are committed to and care about you and your health.

Nurse ID#_____

Patient ID#_____

Importance of Actions

Using a scale of 1 to 9, where 1 is "not at all important" and 9 is "very important," please indicate how important it is to you that your nurse practitioner perform in the ways described below. For example, if it is "very important" to you that your nurse practitioner listen to the concerns, feelings and questions of your family, you should circle the number 9, "very important." If listening to the concerns, feelings and questions of your family is "not at all important," you should circle the number 1. If you believe listening to the concerns, feelings and questions of your family is neither "important" nor "unimportant," you should circle the number 5, "neutral." If you believe the behavior is between "not at all important" and "neutral," circle 2, 3 or 4. If you believe the action rates above "neutral" but not "very important," circle 6, 7 or 8.

	Not at all Important			Somewhat Important				Very Important	
1. Listen to concerns, feelings and questions of the patient's family	1	2	3	4	5	6	7	8	9
2. Respect and support the patient's family's ways of coping	1	2	3	4	5	6	7	8	9
3. Include family members in decision making regarding patient care when appropriate	1	2	3	4	5	6	7	8	9
4. Discuss strategies for normalizing family life with family members	1	2	3	4	5	6	7	8	9
5. Establish trusting relationship between nurse practitioner and family members	1	2	3	4	5	6	7	8	9
6. Respect the privacy of individual family members	1	2	3	4	5	6	7	8	9
7. Encourage open communication between family members	1	2	3	4	5	6	7	8	9
8. Encourage family members to keep or maintain family relationships as appropriate	1	2	3	4	5	6	7	8	9
9. Provide information to family members about patient in accordance with patient preference	1	2	3	4	5	6	7	8	9
10. Facilitate family understanding of the medical aspects of illness	1	2	3	4	5	6	7	8	9
11. Teach family members ways for health recovery and health maintenance	1	2	3	4	5	6	7	8	9
12. Discuss with patient's family members how strengths and available resources can be used to enhance the patient's health	1	2	3	4	5	6	7	8	9
13. Support family efforts to promote patient's health or management of patient's condition when appropriate	1	2	3	4	5	6	7	8	9
14. Encourage family members to recognize and reward positive patient behaviors	1	2	3	4	5	6	7	8	9
15. Facilitate family discussion, as members prioritize data and select the most immediate family issue to address	1	2	3	4	5	6	7	8	9

Nurse's Performance

Using a scale of 1 to 9, where 1 is "never" and 9 is "always," please rate your nurse practitioner's performance on the following items. If you believe your nurse practitioner "never" does one of the listed actions, you should circle the number 1, "never." If you believe your nurse practitioner "always" does one of the actions, you should circle the number 9, "always." If you believe your nurse practitioner does the listed action "sometimes," you should circle the number 5. If you believe the nurse practitioner rates above "never" but not "sometimes," circle 2, 3 or 4. If you believe the nurse practitioner rates above "sometimes" but not "always," circle 6, 7 or 8.

	Never			Sometimes					Alway
1. Listen to concerns, feelings and questions of the patient's family	1	2	3	4	5	6	7	8	9
2. Respect and support the patient's family's ways of coping	1	2	3	4	5	6	7	8	9
3. Include family members in decision making regarding patient care when appropriate	1	2	3	4	5	6	7	8	9
4. Discuss strategies for normalizing family life with family members	1	2	3	4	5	6	7	8	9
5. Establish trusting relationship between nurse practitioner and family members	1	2	3	4	5	6	7	8	9
6. Respect the privacy of individual family members	1	2	3	4	5	6	7	8	9
7. Encourage open communication between family members	1	2	3	4	5	6	7	8	9
8. Encourage family members to keep or maintain family relationships as appropriate	1	2	3	4	5	6	7	8	9
9. Provide information to family members about patient in accordance with patient preference	1	2	3	4	5	6	7	8	9
10. Facilitate family understanding of the medical aspects of illness	1	2	3	4	5	6	7	8	9
11. Teach family members ways for health recovery and health maintenance	1	2	3	4	5	6	7	8	9
12. Discuss with patient's family members how strengths and available resources can be used to enhance the patient's health	1	2	3	4	5	6	7	8	9
13. Support family efforts to promote patient's health or management of patient's condition when appropriate	1	2	3	4	5	6	7	8	9
14. Encourage family members to recognize and reward positive patient behaviors	1	2	3	4	5	6	7	8	9
15. Facilitate family discussion, as members prioritize data and select the most immediate family issue to address	1	2	3	4	5	6	7	8	9

16. How often do you follow your nurse's recommendations:	Never Always			Sometimes					
a. For diet?	1	2	3	4	5	6	7	8	9
b. For exercising?	1	2	3	4	5	6	7	8	9
c. For medications?	1	2	3	4	5	6	7	8	9
d. Overall, how often do you follow your nurse's recommendations?	1	2	3	4	5	6	7	8	9

APPENDIX C

Nurse Practitioner Recruiting Letter

March XX, 1999

Title
Address
City

Dear XXXX,

I am working on the data collection stage of my dissertation in Nursing at the University of Florida, and I need your help.

The purpose of my dissertation is to examine (1) the differences between patients' and nurse practitioners' ratings of importance and performance on selected family interventions and (2) the relationship between importance and performance differences for both patients and nurse practitioners with measures of compliance. The independent variable will be the difference between importance and performance on the family interventions. The dependent variable will be patient adherence/compliance measured three different ways: (1) as perceived by the patient, (2) as rated by the nurse practitioner, and (3) as demonstrated by health indicators. An Abstract is included.

This study will use a convenience sample of 200 patients. This sample size will be developed by interviewing a proportionate number of patients per volunteer nurse practitioner in North Central Florida. The ideal situation for me would be to have 20 nurse practitioners to volunteer with a minimum 10 of their patients who will also volunteer.

To participate in the study, you, or a person you might recommend, must meet the following criteria:

1. Registered Nurse Practitioner for a minimum of two years.
2. Employed in a private practice or hospital clinic.
3. Patient population includes patients with primary diagnosis of a cardiovascular disease condition requiring a treatment plan involving modifications in lifestyle such as medications, diet and exercise.

The nurse practitioner's patients must meet the following criteria:

1. Patient of a Registered Nurse Practitioner.
2. 21 years of age or older.
3. Primary diagnosis of a cardiovascular disease condition requiring a treatment plan involving modifications in lifestyle such as medications, diet and exercise.
4. Has had a minimum three visits with the Registered Nurse Practitioner who volunteered to participate in the study.

Chronological Data Collection Process

1. The primary investigator of this study will recruit nurse practitioners.
2. The primary investigator will explain the study's protocol to volunteer practitioners and have Informed Consent Form signed by the nurse practitioner.
3. The primary investigator will obtain from the volunteer nurse practitioner a list of their patients who meet the eligibility criteria including the dates of their next scheduled appointment.
4. On eligible patients' appointment days, the primary investigator or trained interviewer will solicit patient volunteers from the volunteer nurse practitioners patients when they arrive at the nurse practitioners' clinics for their regularly scheduled visit.
5. Research protocol will be presented to patients and Informed Consent Forms signed by those who volunteer.
6. The primary investigator or trained interviewer will administer the questionnaire to patients who volunteer while they wait for their appointment.
7. Following the volunteer patients' regularly scheduled appointment, the primary investigator or trained interviewer will administer one questionnaire to the nurse practitioner for each volunteer patient. For example, if 10 of the nurse practitioner patients participate, the nurse practitioner will complete 10 questionnaires, one for each volunteer patient after the most recent scheduled patient appointment.

This study's protocol and materials have been approved by the Institutional Review Board, University of Florida Health Science Center. The questionnaire you will complete for each of your volunteer patients will require 10-20 minutes to complete. The questionnaire your volunteer patients will complete will also require 10-20 minutes. An interviewer will be on site to collect data from yourself and your patients. Before we begin data collection, I will meet with you or discuss by telephone (1) the procedures we will follow and (2) collect background information.

As you might expect, I will share the results of my study with you. Unfortunately, I am unable to offer any financial incentive for participating. Your participation will help me complete my degree and, hopefully, provide results that provide direction for your

developing interventions that will help improve patients' adherence/compliance. This should improve patients' satisfaction and produce more cost effective health care.

If you would like to participate in this study, or if you know of someone who might be interested in participating, please contact me as soon as possible. Please call me at my office, (352) 999-9999, or call me, collect, at home in the evening, (352) 999-9999.

Sincerely,

Rita E. K. Sutherland, MSN, ARNP, PhD (c)
9999 NW XX Avenue
Gainesville, FL 32611-8400

Enc: Abstract

The Relationship between Patients' Expectations, Nurse Performance of Family Nursing Interventions and Adherence/Compliance: A Gap Analysis

Patient adherence/compliance is essential to the success of therapeutic health regimens and treatment plans. When patient compliance to prescribed regimens is absent or low, therapeutic goals are not usually achieved or, at best, only partially achieved (Becker and Maiman, 1980). Five social and psychological factors are generally accepted as influencing compliance: (1) knowledge and understanding including communication, (2) quality of interaction including the patient-nurse relationship with patient satisfaction, (3) social isolation and social support including the effect of family, (4) health beliefs and attitudes such as the health belief model variables, and (5) factors associated with the illness and health care regimen (Cameron, 1996).

Currently, in areas of health care where cost-containment is at the core of delivery, the main approach is to insure quality when defining basic health care services. This is accomplished by incorporating interventions that are effective, efficient, appropriate and desired by the patients (Walters and Morgan, 1995). The rapidly changing environment of health care seen today in the United States is an important reason to define aspects of care that are essential in providing comprehensive quality care. Nurses, the largest segment of health care providers, have an opportunity to not only enhance patient care, but affect the economics of the healthcare delivery system by increasing compliance among their patients (Simons, 1992). While many nurses accept and embrace models and theories that include family participation, there is limited research on patient interventions that includes family (Saylor, Conway, Elksnin, Farah, and Pope, 1990). The concept of family, in this perspective, refers to an open system of two or more persons characterized by mutual attachment, caring, long-term commitment, and responsibility to provide individual growth, supportive relationships, health of members and of the unit and maintenance of the organization and system (Craft and Willadsen, 1992). Current nursing practice indicates that nurses view involvement of family, as it relates to the psycho-social aspect of care of their patient, as an important aspect to assist the patient in being compliant. However, there is limited research to validate that nurses are including patient's family when planning nursing interventions (Frost, Bruggen, and Mangan, 1997).

This study will examine (1) the differences between patients' and nurse practitioners' ratings of importance and performance on selected family interventions and (2) the relationship between importance and performance gaps for both patients and nurse practitioners with measures of compliance. Data will be collected with a survey of nurse practitioners (n = 10 to 20) and their patients (n = 200 [10 to 20 patients per each nurse practitioner]) using a self-administered questionnaire. Gap analysis (Dyck, 1996) will be used to determine the difference between importance ratings and performance ratings. The gap (difference) between importance and performance on the family interventions will be the independent variable in the correlation analysis. The dependent variable will be compliance measured three different ways: (1) as perceived by the patient, (2) as rated by the nurse practitioner, and (3) as demonstrated by health indicators.

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BIOGRAPHICAL SKETCH

Rita E. Krull Sutherland graduated from Borgess School of Nursing, Kalamazoo, Michigan in 1970. She served in the United States Air Force Nurse Corps from 1970-72 as a First Lieutenant stationed at Langley Air Force Base, Virginia and Clark Air Base, Philippine Islands. She received her Bachelor of Nursing degree from Michigan State University in 1977 and her Master of Science in Nursing degree from the University of Florida in 1981. She is licensed as an ARNP in Family and Community Nursing.

Her professional experience includes staff and charge nurse positions in medical-surgical nursing and specialty units including ICU, CCU and emergency room nursing. She worked as a pediatrics office nurse, hospital nurse educator and high school health nurse educator. Since 1985, her career has focused on nursing education in associate and baccalaureate degree nursing programs and, most recently, in nursing education administration.

Current professional memberships are Sigma Theta Tau International Honor Society, American Nurses Association and National League for Nursing. She received a Florida League for Nursing Research Grant in spring, 2000.

Rita is married to Dr. John Sutherland and has two children: Joe, a Florida Gator and Kate, a Florida State Seminole.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Sandra F. Seymour, Chair
Associate Professor of Nursing

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

M. Josephine Snider
Associate Professor of Nursing

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Claydell Horne
Associate Professor of Nursing

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

M. David Miller
Professor of Educational Psychology

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Leonard Beeghley
Professor of Sociology

This dissertation was submitted to the Graduate Faculty of the College of Nursing and to the Graduate School and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

August 2001

Kathleen Ann Long
Dean, College of Nursing

Winfred M. Phillips
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